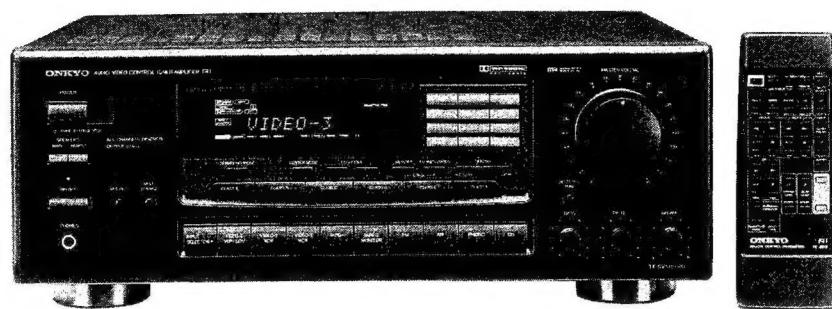


ONKYO SERVICE MANUAL

QUARTZ SYNTHESIZED TUNER AMPLIFIER



Black model

BHMD, BHMDN, BHMDC	120V AC, 60Hz
BHMP	230V AC, 50Hz
BHMW	120/220V AC, 50/60Hz
BHMQA	240V AC, 50Hz

SAFETY-RELATED COMPONENT WARNING!!
 COMPONENTS IDENTIFIED BY MARK Δ ON THE SCHEMATIC DIAGRAM AND IN THE PARTS LIST ARE CRITICAL FOR RISK OF FIRE AND ELECTRIC SHOCK. REPLACE THESE COMPONENTS WITH ONKYO PARTS WHOSE PART NUMBERS APPEAR AS SHOWN IN THIS MANUAL.
 MAKE LEAKAGE-CURRENT OR RESISTANCE MEASUREMENTS TO DETERMINE THAT EXPOSED PARTS ARE ACCEPTABLY INSULATED FROM THE SUPPLY CIRCUIT BEFORE RETURNING THE APPLIANCE TO THE CUSTOMER.

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SPECIFICATIONS

AMPLIFIER SECTION

Power Output:	Stereo mode
	Front L/R channels
	80 watts per channel min. RMS. at 8 ohms, both channels driven, from 20 Hz to 20,000 Hz, with no more than 0.08% total harmonic distortion.
Continuous Power output:	
	2 x 115 watts 4 ohms 1 kHz DIN
	2 x 90 watts 8 ohms 1 kHz DIN
	Surround mode and Multi source mode
	Front L/R and center channels
	55 watts per channel min. RMS. at 8 ohms 1,000 Hz, with no more than 0.08% total harmonic distortion.
Rear or Remote channels	
	20 watts per channel min. RMS. at 8 ohms 1,000 Hz, with no more than 0.8% total harmonic distortion.
Total Harmonic Distortion:	0.08% at rated power (FRONT)
IM Distortion:	0.08% at rated power (FRONT)
Damping Factor:	60 at 8 ohms (FRONT)
Sensitivity and Impedance:	Phono: 2.5 mV/50 kohms CD/Tape Play: 150 mV/50 kohms Tape Rec: 150 mV/2.2 kohms
Phono Overload:	120 mV RMS. at 1,000 Hz, 0.5% THD.
Frequency Response:	20 to 30,000 Hz, +/-1 dB
RIAA Deviation:	20 to 20,000 Hz, +/-0.8 dB
Tone Control:	BASS: +/-10 dB at 100 Hz TREBLE: +/-10 dB at 10,000 Hz
Signal to Noise Ratio:	PHONO: 80 dB (IHF A, 5 mV input) CD/TAPE: 100 dB (IHF A)
Muting:	-∞ dB

VIDEO SECTION

Signal sensitivity and impedance
VDP/VCR input, output: 1 Vp-p, 75 ohms

TUNER SECTION

FM: (other models)

Tuning Range:	87.5 — 108.0 MHz (50 kHz steps)
Usable Sensitivity:	Mono: 11.2 dBf, 1.0 μV, 75 ohms 0.9 μV (S/N 26 dB, 40 kHz Devi.) 75 ohms DIN
	Stereo: 18.0 dBf, 2.2 μV, 75 ohms 23 μV (S/N 46 dB, 40 kHz Devi.) 75 ohms DIN
50dB Quieting Sensitivity:	Mono: 18.0 dBf, 2.2 μV, 75 ohms Stereo: 37.2 dBf, 20 μV, 75 ohms
Capture Ratio:	1.5 dB
Image Rejection Ratio:	85 dB
IF Rejection Ratio:	90 dB
Signal-to-Noise Ratio:	Mono: 73 dB Stereo: 67 dB
Selectivity:	50 dB DIN (±300 kHz, 40 kHz Devi.)
AM Suppression Ratio:	50 dB
Harmonic Distortion:	Mono: 0.15 % Stereo: 0.25 %
Frequency Response:	30 — 15,000 Hz ±1.5 dB
Stereo Separation:	45 dB at 1 kHz

AM:

Tuning Range:	European models 522 — 1611 kHz (9 kHz steps)
	USA and Canadian models 530 — 1710 kHz (10 kHz steps)
	Saudi Arabia and worldwide models 531 — 1602 kHz (9 kHz steps)
Usable Sensitivity:	30 μV
Image Rejection Ratio:	40 dB
IF Rejection Ratio:	40 dB
Signal-to-Noise Ratio:	40 dB
Total Harmonic Distortion:	0.7 %

TUNER SECTION

FM: (120V model)

Tuning Range:	87.5 — 108.0 MHz (50 kHz steps)
Usable Sensitivity:	Mono: 11.2 dBf, 2.0 μV Stereo: 17.2 dBf, 4.0 μV
50dB Quieting Sensitivity:	Mono: 17.2 dBf, 4.0 μV Stereo: 37.2 dBf, 4.0 μV
Capture Ratio:	1.5 dB
Image Rejection Ratio:	40 dB
IF Rejection Ratio:	90 dB
Signal-to-Noise Ratio:	Mono: 73 dB Stereo: 67 dB
Alternate Channel Attenuation:	55 dB
AM Suppression Ratio:	50 dB
Total Harmonic Distortion:	Mono: 0.15 % Stereo: 0.25 %
Frequency Response:	30 — 15,000 Hz +/-1.5 dB
Stereo Separation:	45 dB at 1 kHz/30 dB at 100 — 10,000 Hz
Muting Level:	17.2 dBf, 4.0 μV

GENERAL

Dimensions (W x H x D):	455 x 170 x 388 mm 17-15/16" x 6-11/16" x 15-5/16"
Weight:	13.5 kg (29.8 lbs)

SERVICE PROCEDURES

1. Replacing the fuses

For continued protection against fire hazard, replace only with same type and same rating fuse.

Circuit no.	Part no.	Description
F901	252166Y	△6.3A-UL/T-237,Primary fuse <D/W>
F902	252076	△3.15A-SE-EAK,Primary fuse <P/W/Q>
F903	252075	△2.5A-SE-EAK,AC outlet fuse <P>
F911,F912	252166Y	△6.3A-UL/T-237,Secondary fuse <D>
	252079	△6.3A-SE-EAK,Secondary fuse <P/W/Q>

NOTE: <D> :Only 120V model

<P> :Only 230V model

<W> :Only Worldwide model

<P> :Only 240V model

2. Change of FM/AM band step.

With the exception of the Worldwide model, a BAND STEP selector switch is not provided.

(AM)

BAND STEP	R724	D711
10kHz→9kHz	Addition	Addition
9kHz→10kHz	Eliminated	Eliminated

In R724 Carbon resistor 1 kΩ (Part No.417341024) is used.

In D711 Diode 1SS270A

(Part No.223205) is used.

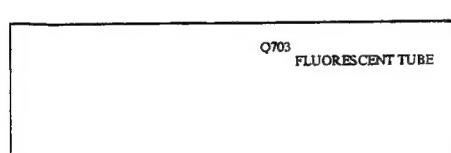
— Worldwide model —

Worldwide models are equipped with a step band selector switch. This switch is located on the back panel. This switch is set to 9kHz (AM) at the factory, but may have to be reset to 10kHz depending on the area where the unit is used.

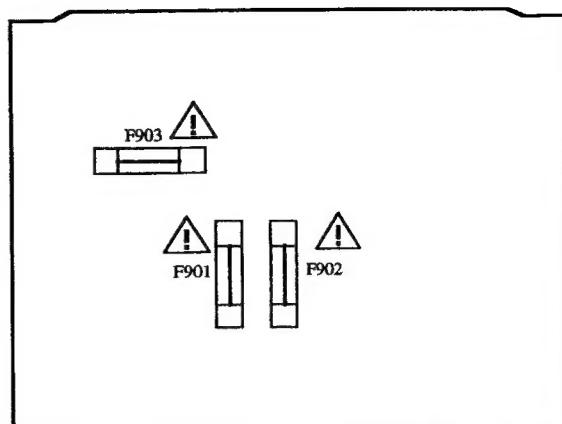
AM step

Europe: 9kHz

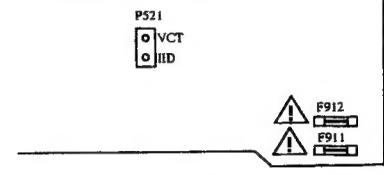
U.S.A: 10kHz



DISPLAY CIRCUIT PC BOARD



POWER SUPPLY CIRCUIT PC BOARD



MAIN CIRCUIT PC BOARD

3. Memory preservation

This unit does not require memory preservation batteries. A built-in memory power back-up system preserves contents of the memory during power failures and even when the unit is unplugged. The unit must be plugged in and the power switch turned on and off once in order to charge the back-up system. Note that since this is not a permanent memory the power switch must be turned on and off a few times each month to keep the back-up system operative. The period of time during which memory contents are preserved after power has last been turned off varies depending on climate and placement of the unit. On the average, memory contents are protected over a period of 3 to 4 weeks (a minimum of 2 weeks) after the last time power has been turned off. This period is shorter when the unit is exposed to very high humidity or used in an area with an extremely humid climate.

4. Safety-check out

(Only U.S.A. model)

After correcting the original service problem perform the following safety check before releasing the set to the customer.

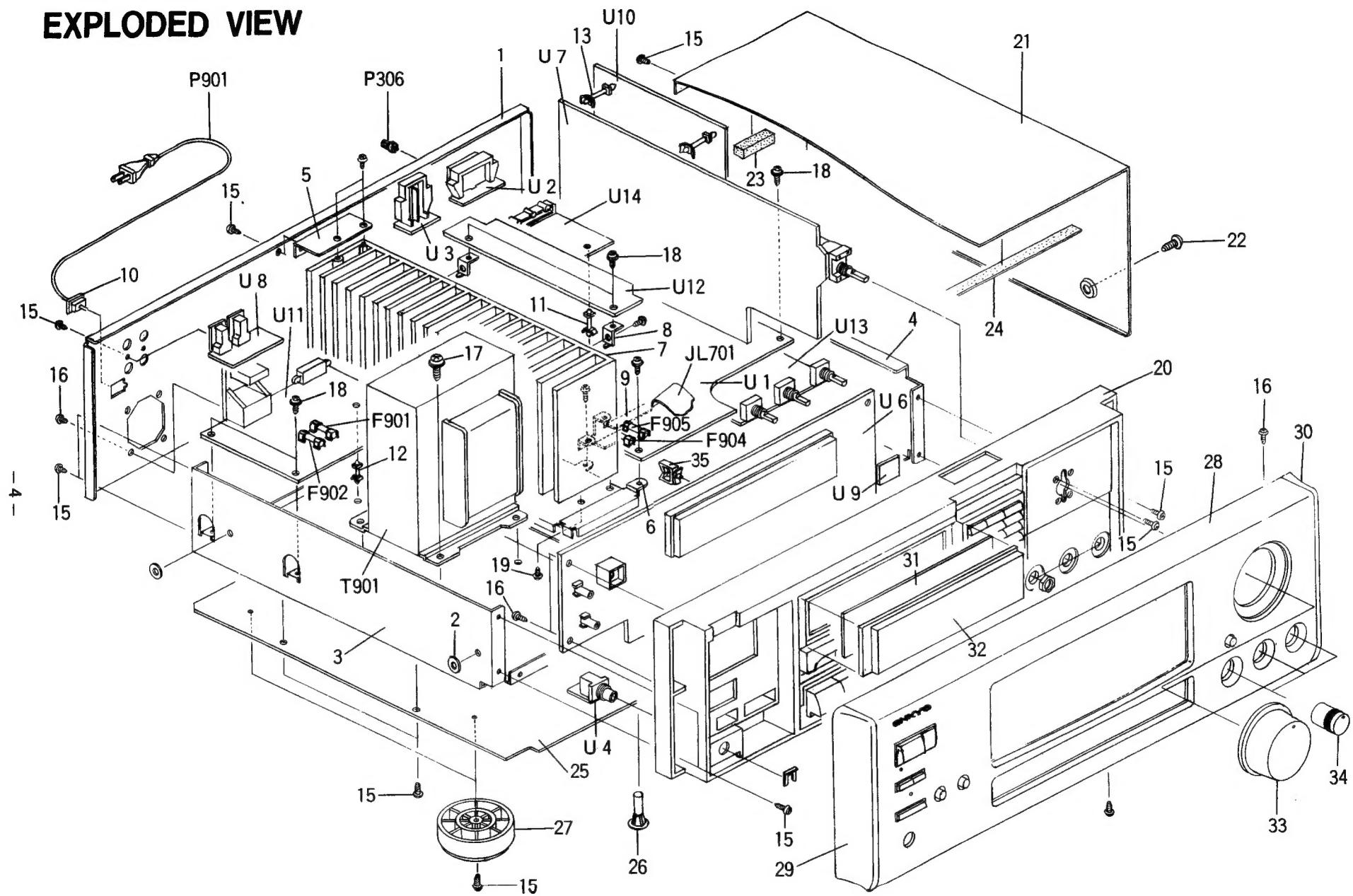
Connect the insulating-resistance tester between the plug of power supply cord and terminal GND on the back panel. Specifications: 3.3 Mohm ±10% at 500V.

5. Change of voltage

Worldwide models are equipped with a voltage selector to conform with local power supplies. This switch is located on the back panel. Be sure to set this switch to match the voltage of the power supply in your area before turning the power switch on.

This switch is set to 220V at the factory. Voltage is changed by sliding the groove in the switch with the screwdriver to the right or left. Confirm that the switch has been moved all the way to the right or left before turning the power switch on.

EXPLODED VIEW



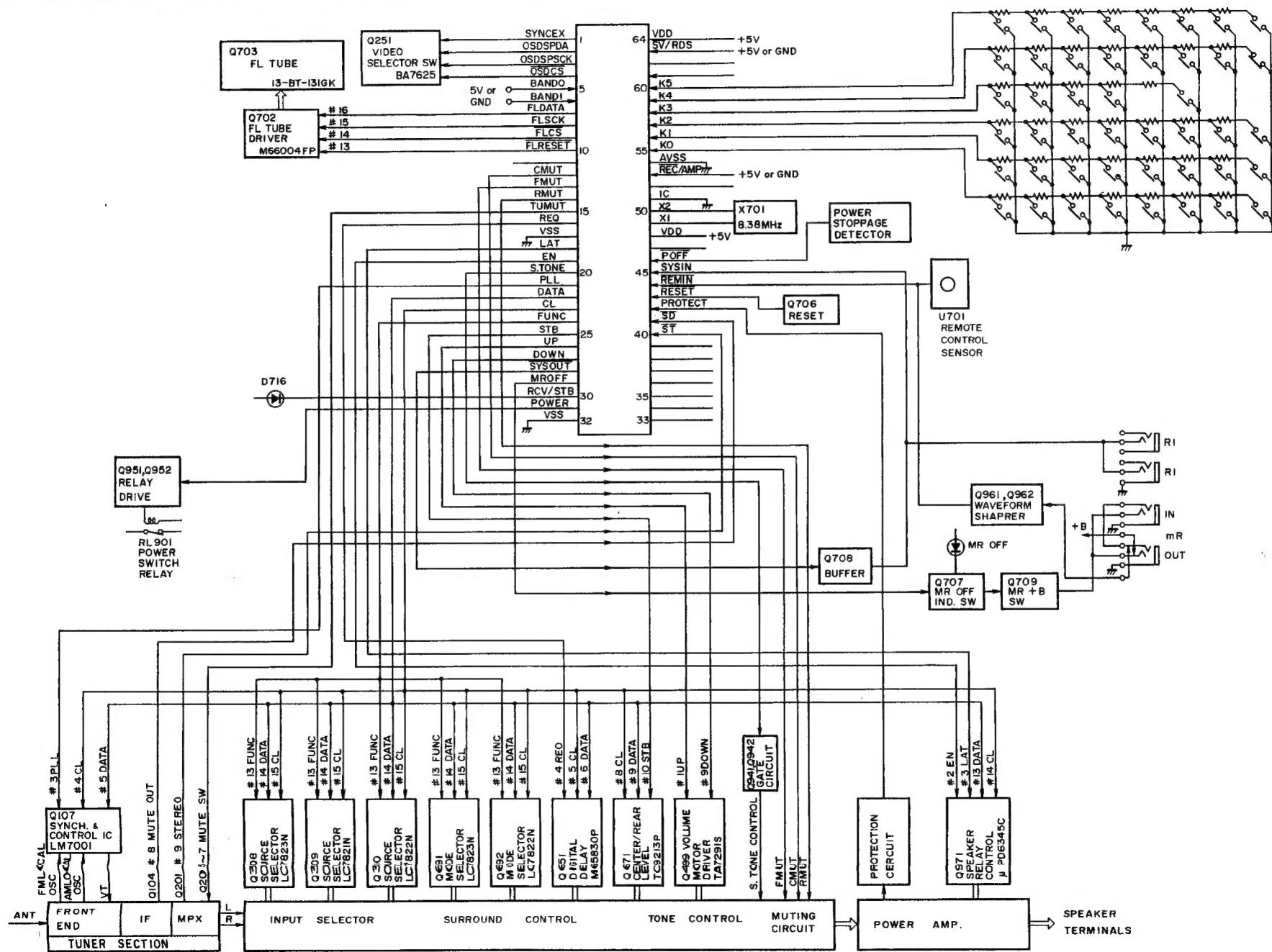
PARTS LIST

REF.NO.	PART NO.	DESCRIPTION	REF.NO.	PART NO.	DESCRIPTION	REF.NO.	PART NO.	DESCRIPTION		
1	27121706AY	Rear panel <D>	P901	253163Y or 253174Y	△ AS-UC-6 #18, △ Power supply cord <D/PX>	U3	1A425594-1	NAETC-4694-1,Speaker terminal pc board ass'y <D>		
	27121707AY	Rear panel <P>		253164Y or 253175Y	△ AS-CEE, △ Power supply cord <P>		1A425594-1A	NAETC-4694-1A,Speaker terminal pc board ass'y <P/W/Q>		
	27121708AY	Rear panel <W>		253170	△ AS-SAA,Power supply cord <Q>	U4	1A425595-1	NAETC-4695-1,Headphone terminal pc board ass'y		
	27121709AY	Rear panel <Q>		253172 or 253092-1A	△ AS-CEE-2, △ Power supply cord <W>	U6	1A425597-1	NADIS-4697-1,Display circuit pc board ass'y <D>		
2	27270212	Spacer <P/W/Q>	P902,P903	25050904	△ NSCT-2P697,AC outlet <Q>		1A425597-1A	NADIS-4697-1A,Display circuit pc board ass'y <P/Q>		
3	27130717AY	Bracket,power transformer	Q505,Q506	2201653, 2201654, 2201655, 2202272 or 2202273	* 2SC3856-O, * 2SC3856-Y, * 2SC3856-P, * 2SC3907-R or * 2SC3907-O,Power transistors		1A425597-1B	NADIS-4697-1B,Display circuit pc board ass'y <W>		
4	27115255Y	Side bracket		Q507,Q508	2201663, 2201664, 2201665, 2202262 or 2202263	* 2SA1492-O, * 2SA1492-Y, * 2SA1492-P, * 2SA1516-R or * 2SA1516-O,Power transistors	U7	1A425598-1	NAAF-4698-1,Surround circuit pc board ass'y	
5	27141607Y	Retainer H		Q543	2202253, 2202254, 2202256, 2202502 or 2202503	* 2SC4467-O, * 2SC4467-Y, * 2SC4467-P, * 2SC3182N-R or * 2SC3182N-O,Power transistor	U8	1A425599-1	NAETC-4699-1,RI/MR terminal pc board ass'y <D/P/Q>	
6	27130718Y	Bracket H		Q544	2202243, 2202244, 2202246, 2202492 or 2202493	* 2SA1694-O, * 2SA1694-Y, * 2SA1694-P, * 2SA1264N-R or * 2SA1264N-O,Power transistor	U9	1A425500-1	NASW-4700-1,STC switch pc board ass'y	
7	27160323Y	Radiator					U10	1A425501-1	NARF-4701-1,Tuner circuit pc board ass'y <D>	
8	27141530A	Retainer HS-2						1A425501-1A	NARF-4701-1A,Tuner circuit pc board ass'y <P/Q>	
9	27141532	Retainer PD-1						1A425501-1B	NARF-4701-1B,Tuner circuit pc board ass'y <W>	
10	27300750	△ Cord,bushing						1A425501-1B	NARF-4701-1B,Tuner circuit pc board ass'y <P/Q>	
11	27190369	KGLS-22S,Holder						1A425502-1	NAPS-4702-1,Power supply circuit pc board ass'y <D>	
12	27190480	KGLS-8S,Holder						1A425502-1A	NAPS-4702-1A,Power supply circuit pc board ass'y <P>	
13	27190062	KGLS-12S,Holder						1A425502-1B	NAPS-4702-1B,Power supply circuit pc board ass'y <W>	
14	801433	3SMSBW.SW+14B(BC),Sems screw						1A425502-1C	NAPS-4702-1C,Power supply circuit pc board ass'y <Q>	
15	834430088	3TTS+8B(BC),Self-tapping screw						1A425502-1D	NAPS-4702-1D,Power supply circuit pc board ass'y <PX>	
16	833430080	3TTP+8P(BC),Self-tapping screw					U11	1A425503-1	NAAF-4703-1,Rear amplifier pc board ass'y <D>	
17	830440089	4TTC+8C(BC),Self-tapping screw						1A425503-1A	NAAF-4703-1A,Rear amplifier pc board ass'y <P/W/Q>	
18	831130088	3TTW+8B,Self-tapping screw						1A425503-1B	NAAF-4703-1B,Rear amplifier pc board ass'y <P>	
19	834430108	3TTS+10B(BC),Self-tapping screw						1A425503-1C	NAAF-4703-1C,Rear amplifier pc board ass'y <W>	
20	27110754CY	Front bracket ass'y						1A425503-1D	NAAF-4703-1D,Rear amplifier pc board ass'y <Q>	
21	28184535Y	Top cover						U12	1A425503-1	NAAF-4703-1,Rear amplifier pc board ass'y <D>
22	838440089	4TTB+8C(BC),Self-tapping screw						1A425503-1A	NAAF-4703-1A,Rear amplifier pc board ass'y <P/W/Q>	
23	28141132	6 t x 60 x 10,Cushion						1A425504-1	NAAF-4704-1,Tone control circuit pc board ass'y	
24	28140546Y	0.5 t x 390 x 10,Cushion						1A425505-1	NAETC-4705-1,Video circuit pc board ass'y	
25	27170300AY	Bottom panel	Q575,Q576	2202063, 2202064 or 2202066	* 2SC4511-O, * 2SC4511-Y or * 2SC4511-P,Power transistors					
26	27190926	KGLS-18RF,Holder		2202053, 2202054 or 2202056	* 2SA1725-O, * 2SA1725-Y or * 2SA1725-P,Power transistors					
27	27175251AY	Leg		T901	2300891Y 2300892Y 2300893Y 2300894Y	△ NPT-1168D,Power transformer <D> △ NPT-1168P,Power transformer <P> △ NPT-1168DG,Power transformer <W> △ NPT-1168Q,Power transformer <Q>	U13	1A425504-1	NAAF-4704-1,Tone control circuit pc board ass'y	
28	1A425701K	Front panel ass'y	Q577,Q578	U1	1A425592-1	NAAR-4692-1,Main circuit pc board ass'y <D>	U14	1A425505-1	NAETC-4705-1,Video circuit pc board ass'y	
29	28125251AY	End cap L			1A425592-1A	NAAR-4692-1A,Main circuit pc board ass'y <P/W/Q>				
30	28125252AY	End cap R			U2	1A425593-1	NAETC-4693-1,Center speaker terminal pc board ass'y <D>			
31	28191661	Clear plate			1A425593-1A	NAETC-4693-1A,Center speaker terminal pc board ass'y <P/W/Q>				
32	28133299Y	Back plate								
33	28324775	Knob VOLUME								
34	28324376A	Knob TONE								
35	260220	WS-3NS,Clamp								
F901	252166Y	△ 6.3A-UL/T-237,Primary fuse <D/W>								
F902	252076	△ 3.15A-SE-EAK,Primary fuse <P/W/Q>								
F903	252075	△ 2.5A-SE-EAK,Primary fuse <P>								
F911,F912	252166Y	△ 6.3A-UL/T-237,Secondary fuse <D>								
	252079	△ 6.3A-SE-EAK,Secondary fuse <P/W/Q>								
JL701	2041322010 or 2047322012Y	NCFC1-322010 or NCFC7-322012,flexible flat cable								
P306	25060044	Terminal,ground								

NOTE: THE COMPONENTS IDENTIFIED BY MARK △
ARE CRITICAL FOR RISK OF FIRE AND
ELECTRIC SHOCK. REPLACE ONLY WITH
PART NUMBER SPECIFIED.

NOTE: <D>:120V model only
<P>:230V model only
<W>:Worldwide model only
<Q>:240V model only
<PX>:PX model only

MICROPROCESSOR DESCRIPTIONS



Terminal Description

Pin No.	Function	I/O	Description												
1	SYNCEX	O	Video signal control A output terminal.												
2	OSDSPDA	O	Video signal control D output terminal.												
3	OSDPSCK	O	Video signal control B output terminal.												
4	OSDCS	O	Video signal control C output terminal.												
5	BAND0	I	Initializing input terminal for FM/AM band region.												
6	BAND1	I													
7	FLSDATA	O	Connect to the terminal SDATA of Fluorescent tube driver M66004FP. (Q702)												
8	FLSCK	O	Connect to the terminal SCK of Fluorescent tube driver M66004FP.												
9	FLCS	O	Connect to the terminal CS of Fluorescent tube driver M66004FP.												
10	FLRST	O	Connect to the terminal RESET of Fluorescent tube driver M66004FP.												
11	PLAYER	O	Player control output terminal. Not used.												
12	CENTMUT	O	Muting output terminal for the center amplifier.												
13	FRONTMUT	O	Muting output terminal for the front amplifier.												
14	REAR MUT	O	Muting output terminal for the rear amplifier.												
15	TU MUT	O	Muting output terminal for the tuner.												
16	REQ	O	Connect to the terminal REQ of Digital delay M65830P.(Q651)												
17	VSS	-	Ground terminal												
18	LAT	O	Connect to the terminal LAT of Output extended IC μ PD6345C.(Q971)												
19	EN	O	Connect to the terminal EN of Output extended IC μ PD6345C.												
20	S.TONE	O	Selective tone control output terminal.												
21	PLL	O	Connect to the terminal CE of PLL IC.(Q107)												
22	DATA	O	Connect to the terminal DI of Analog switches LC7821N,LC7822N, and LC7823N, the terminal DATA of PLL IC LM7001, the terminal DATA of Electro volume TC9213P, the terminal DATA of Digital delay M65830P, and the terminal SIN of Output extended IC μ PD6345C.												
23	CL	O	Connect to the terminal CL of Analog switches LC7821N,LC7822N, and LC7823N, the terminal CL of PLL IC LM7001, the terminal CK of Electro volume TC9213P, the terminal SCK of Digital delay M65830P, and the terminal SCK of Output extended IC μ PD6345C.												
24	FUNC	O	Connect to the terminal CE of Analog switches LC7821N,LC7822N, and LC7823N. (Q309,Q310,Q692,Q308 and Q691)												
25	STB	O	Connect to the terminal STB of Electro volume TC9213P. (Q671)												
26	VOLUP	O	Volume UP/DOWN control output. (Q499)												
27	VOLDOWN	O	<table border="1"> <tr> <td>Operation</td> <td>#27</td> <td>#26</td> </tr> <tr> <td>Stop</td> <td>H</td> <td>H</td> </tr> <tr> <td>Volume up</td> <td>L</td> <td>H</td> </tr> <tr> <td>Volume down</td> <td>H</td> <td>L</td> </tr> </table>	Operation	#27	#26	Stop	H	H	Volume up	L	H	Volume down	H	L
Operation	#27	#26													
Stop	H	H													
Volume up	L	H													
Volume down	H	L													
28	SYSOUT	O	System code output terminal.												

VIDEO SIGNAL CONTROL OUTPUT

Input Selector

#1	#3	SOURCE
L	L	VIDEO-3
H	L	VIDEO-2
L	H	
H	H	VIDEO-1

Recording Selector

#4	#2	SOURCE
L	L	VIDEO-3
H	L	VIDEO-2
L	H	
H	H	VIDEO-1
Same as #1	Same as #3	Other position
Same as #1	Same as #3	Multi mode

Pin No.	Function	I/O	Description
29	<u>MR</u>	O	MULTI ROOM indicator control output.
30	<u>STBY/RECV</u>	O	STAND-BY/RECEIVED indicator control output.
31	<u>POWER</u>	O	Power switch relay control output.
32	<u>VSS</u>		Ground terminal.
33	—	O	Not used.
34	—	O	Not used.
35	—	O	Not used.
36	—	O	Not used.
37	—	O	Not used.
38	—	O	Not used.
39	—	I	Not used.
40	<u>STEREO</u>	I	Stereo detection input terminal.
41	<u>SD</u>	I	Broadcast detection input terminal.
42	<u>PROTECT</u>	I	Protection circuit operation detection input terminal.
43	<u>RESET</u>	I	System reset input terminal.
44	<u>REMIN</u>	I	Remote control signal input terminal.
45	<u>SYSIN</u>	I	System code input terminal.
46	<u>P OFF</u>	I	Detection input terminal for the stoppage of electric current.
47	—	I	Not used.
48	<u>VDD</u>		Power supply terminal.(+5V)
49	X2		Ceramic resonator connection terminal for the main system clock .
50	X1		Connect the ceramic resonator 8.38 MHz.
51	IC		Connect to the ground terminal.
52	XT2		Not used.
53	XT1		
54	<u>AVSS</u>		Ground terminal of A/D converter.
55	K0	I	
56	K1	I	
57	K2	I	Operation key connection terminals.
58	K3	I	
59	K4	I	
60	K5	I	
61	—		
62	<u>MODE</u>	I	Initializing input terminal for Receiver or Amplifier.
63	<u>AVDD</u>		Analogue power supply terminal of A/D converter. (+5V)
64	<u>AVREF</u>		Reference voltage input terminal of A/D converter.

Initializing Input

#7,#6

BAND1	BAND0	Regin	Band	Frequency Range	Channel Space
0	0	U.S.A.	FM	87.50~108.00MHz	50kHz
			AM	530~1710kHz	10kHz
0	1	Europe	FM	87.50~108.00MHz	50kHz
			AM	530~1710kHz	9kHz
1	0	Worldwide	FM	87.50~108.00MHz	50kHz
			AM	530~1710kHz	9kHz
1	1	Japan	FM	87.50~108.00MHz	100kHz
			AM	530~1710kHz	9kHz

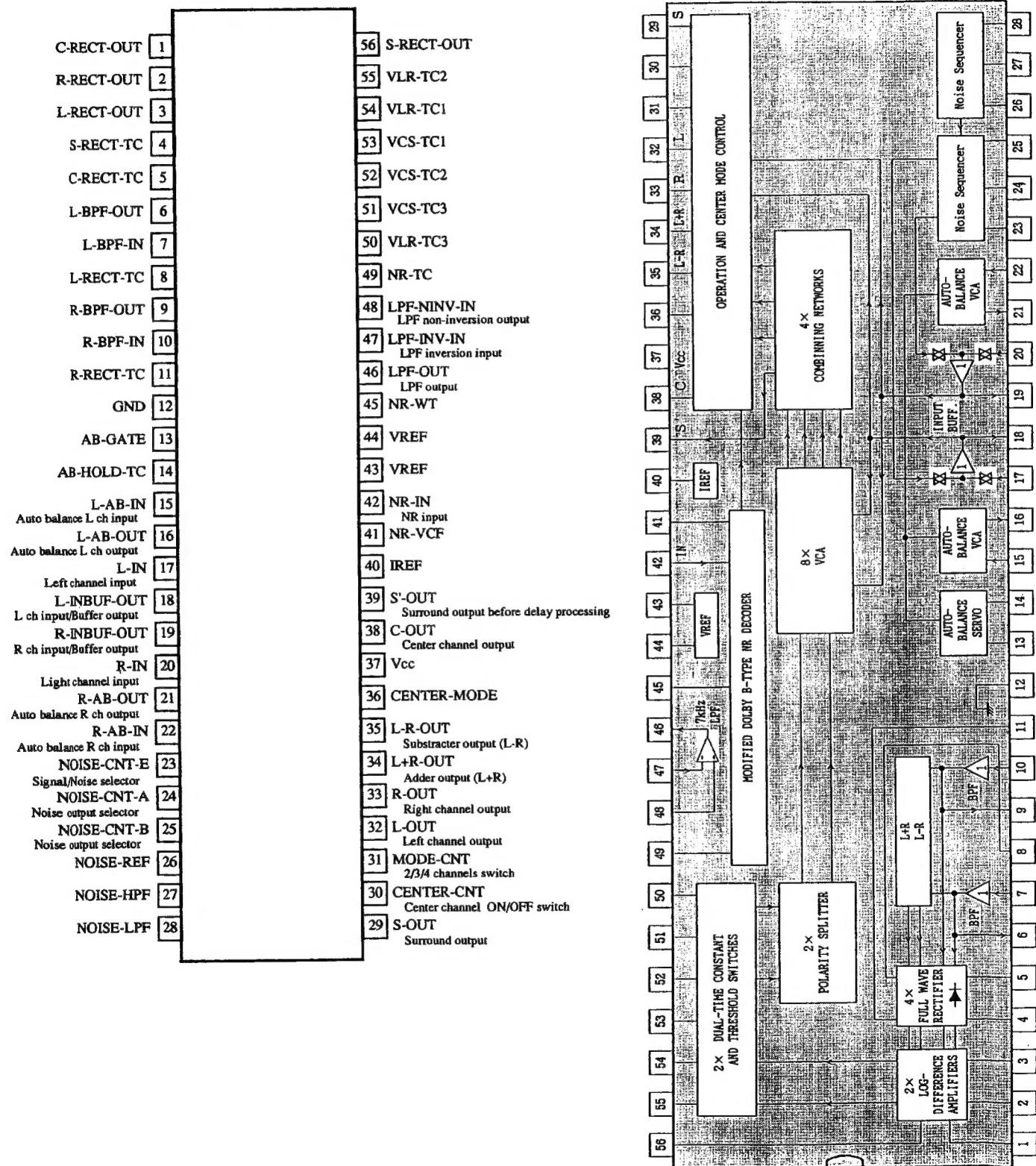
#62

MODE	OPERATION
0	Receiver
1	Amplifier

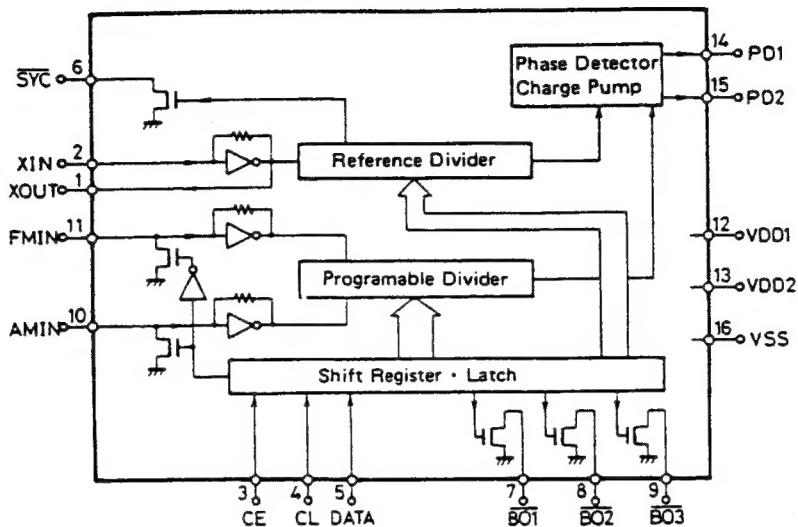
IC BLOCK DIAGRAMS AND DESCRIPTIONS

Q602

NJM2177L / M69032P (Dolby Pro Logic)

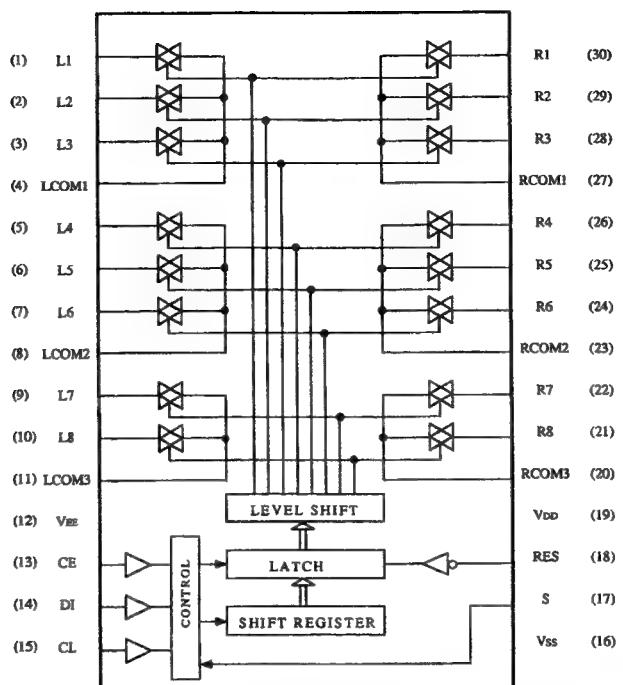


Q107
LM7001 (PLL Synthesizer and Controller)



Pin No.	Terminal	Description
1	XOUT	Connect to the 7.2 MHz crystal oscillator.
2	XIN	
3	CE	Chip enable terminal. Connect to the PLL terminal of microprocessor.
4	CL	Serial clock input terminal. Connect to the CLOCK terminal of microprocessor.
5	DATA	Serial data input terminal. Connect to the DATA terminal of microprocessor.
6	SYN	Not used.
7	AUTO/MONO	AUTO/MONO selection output terminal. "L" when AUTO.
8	FM	FM band control output terminal. "L" when FM.
9	AM	AM band control output terminal. "L" when AM.
10	AMIN	AM local oscillator input terminal.
11	FMIN	FM local oscillator terminal.
12	VDD 1	Power supply terminal for back-up.
13	VDD 2	Power supply terminal.
14	PD1	Charge pump output of the phase detector which constitutes the PLL. High level is output when the divided local oscillator frequency is high than the reference frequency.
15	PD2	In the opposite case, low level is output. Floating occurs when the frequencies matched. The output is applied to the variable capacitor diode in the local oscillator through the low pass filters.
16	Vss	Ground terminal.

Q310, Q692
LC7822N (Analogue switch)



Q310

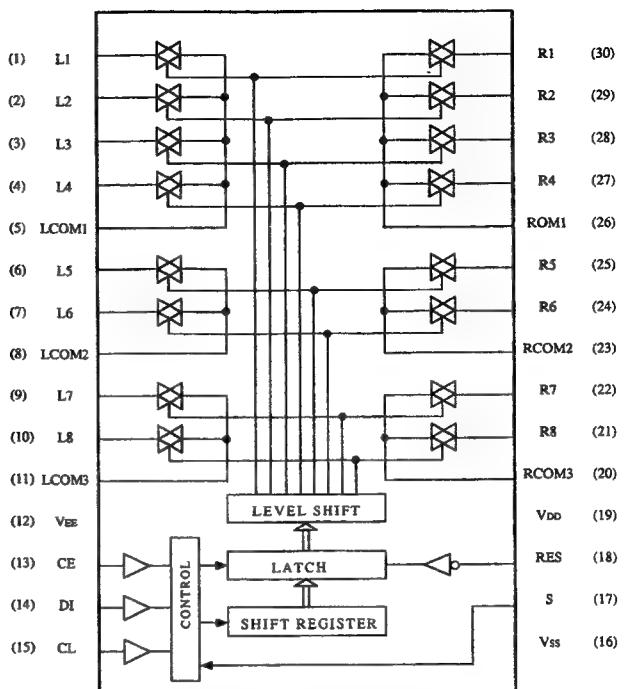
Pin No.	Terminal	Description	Pin No.	Terminal	Description
1	VIDEO-3' REC		16	VEE	Ground terminal
2	VIDEO-2'		17	S	Selector terminal
3	VIDEO-2' REC		18	RES	Reset terminal. When power is turned on, the condition of the analogue switch is not determined, but when this terminal is "L", all analogue switches are off.
4	LCOM1		19	VDD	Power supply terminal (+15V)
5	VIDEO-2 MON		20	RCOM3	Input/output terminals of VIDEO-3 signal of right channel.
6	VIDEO-2		21	VIDEO-3	Control the analogue switch at the serial data.
7	VIDEO-3 MON		22	VIDEO-3'	
8	LCOM2		23	RCOM2	Input/output terminals of audio signal of right channel.
9	VIDEO-3'		24	VIDEO-3 MON	Control the analogue switch at the serial data.
10	VIDEO-3		25	VIDEO-2	
11	LCOM3		26	VIDEO-2 MON	Control the analogue switch at the serial data.
12	Vss	Negative power supply terminal (-15V)	27	RCOM1	Input/output terminals of multi source of right channel.
13	CE	Chip enable terminal. Connect to the terminal FUNC of the microprocessor.	28	VIDEO-2' REC	Control the analogue switch at the serial data.
14	DI	Serial data input terminal. Connect to the terminal DATA of the microprocessor.	29	VIDEO-2'	
15	CL	Serial clock input terminal. Connect to the terminal CL of the microprocessor.	30	VIDEO-3' REC	Control the analogue switch at the serial data.

Q692

Pin No.	Terminal	Description	Pin No.	Terminal	Description
1	SURROUND		16	VEE	Ground terminal
2	NC		17	S	Selector terminal
3	MULTI		18	RES	Reset terminal. When power is turned on, the condition of the analogue switch is not determined, but when this terminal is "L", all analogue switches are off.
4	LCOM1		19	VDD	Power supply terminal (+15V)
5	MULTI		20	RCOM3	
6	HALL		21	DOLBY	
7	DOLBY		22	DOLBY	Input/output terminals of audio signal of right channel.
8	LCOM2		23	RCOM2	Control the analogue switch at the serial data.
9	DOLBY		24	DOLBY	
10	DOLBY		25	HALL	
11	LCOM3		26	MULTI	
12	Vss	Negative power supply terminal (-15V)	27	RCOM1	
13	CE	Chip enable terminal. Connect to the terminal FUNC of the microprocessor.	28	MULTI	
14	DI	Serial data input terminal. Connect to the terminal DATA of the microprocessor.	29	NC	
15	CL	Serial clock input terminal. Connect to the terminal CL of the microprocessor.	30	SURROUND	

Q309

LC7821N (Analogue switch)

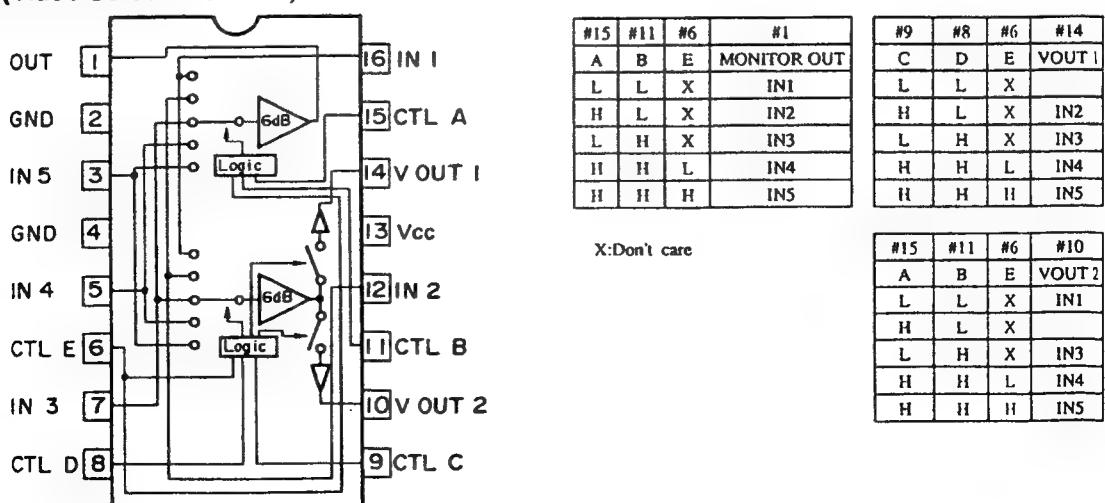


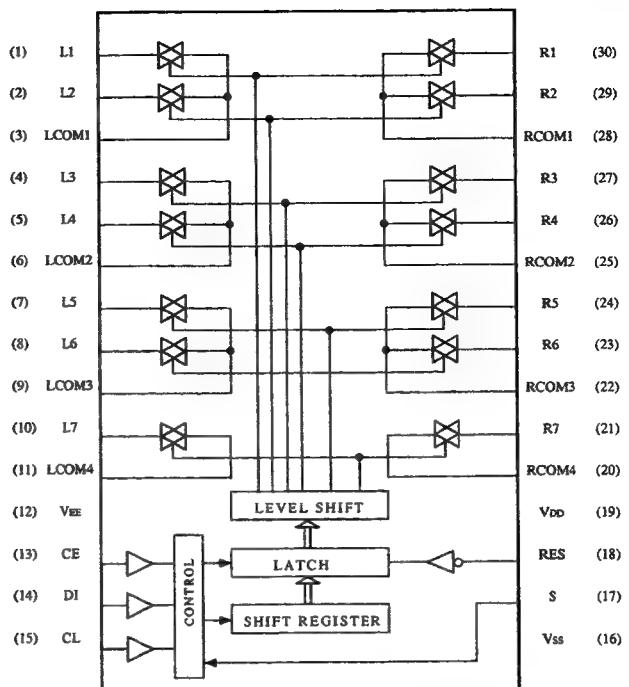
Q309

Pin No.	Terminal	Description	Pin No.	Terminal	Description
1	VIDEO-1'		16	VEE	Ground terminal
2	TUNER'		17	S	Selector terminal
3	TAPE-1'	Input/output terminals of multi source of left channel.	18	RES	Reset terminal. When power is turned on, the condition of the analogue switch is not determined, but when this terminal is "L", all analogue switches are off.
4	TAPE-1' REC	Control the analogue switch at the serial data.	19	VDD	Power supply terminal (+15V)
5	LCOM1		20	RCOM3	Input/output terminals of audio signal of right channel.
6	TAPE-1 MON	Input/output terminals of TAPE-1 signal of left channel.	21	VIDEO-1	Control the analogue switch at the serial data.
7	TAPE-1		22	TUNER	
8	LCOM2	Control the analogue switch at the serial data.	23	RCOM2	Input/output terminals of TAPE-1 signal of right channel.
9	TUNER		24	TAPE-1	Control the analogue switch at the serial data.
10	VIDEO-1	Input/output terminals of audio signal of left channel.	25	TAPE-1 MON	
11	LCOM3	Control the analogue switch at the serial data.	26	RCOM1	
12	Vss	Negative power supply terminal (-15V)	27	TAPE-1' REC	Input/output terminals of multi source of right channel.
13	CE	Chip enable terminal. Connect to the terminal FUNC of the microprocessor.	28	TAPE-1'	
14	DI	Serial data input terminal. Connect to the terminal DATA of the microprocessor.	29	TUNER'	Control the analogue switch at the serial data.
15	CL	Serial clock input terminal. Connect to the terminal CL of the microprocessor.	30	VIDEO-1'	

Q251

BA7625 (Video Selector Switch)



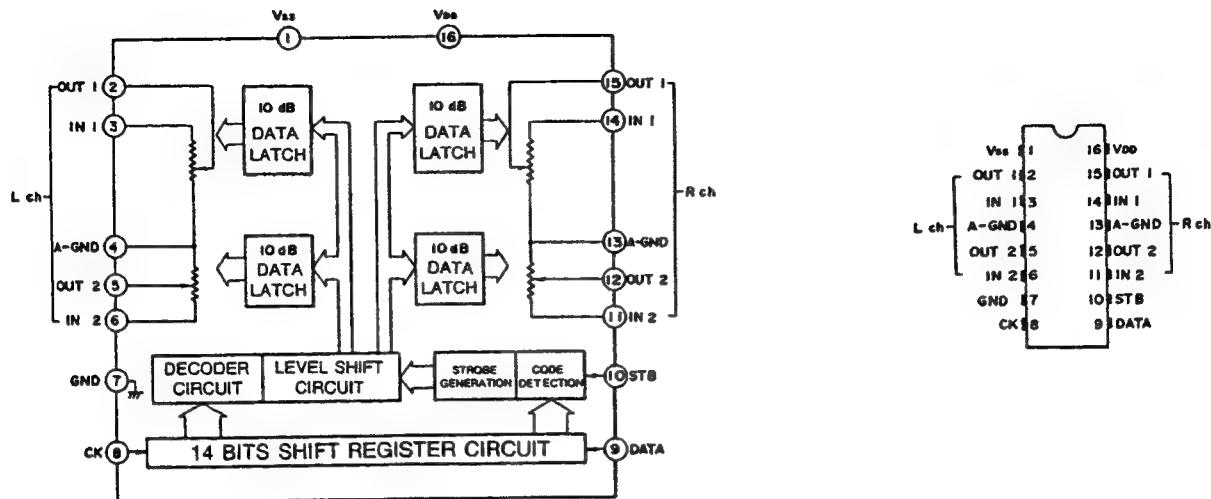
Q308, Q691
LC7823N (Analogue switch)
**Q308**

Pin No.	Terminal	Description	Pin No.	Terminal	Description
1	PHONO'	Input/output terminals of multi source of left channel. Control the analogue switch at the serial data.	16	VEE	Ground terminal
2	CD'		17	S	Selector terminal
3	LCOM1		18	RES	Reset terminal. When power is turned on, the condition of the analogue switch is not determined, but when this terminal is "L", all analogue switches are off.
4	CD	Input/output terminals of audio signal of left channel. Control the analogue switch at the serial data.	19	VDD	Power supply terminal (+15V)
5	PHONO		20	RCOM4	Input/output terminals of multi source of right channel.
6	LCOM2		21	TAPE-2'	Control the analogue switch at the serial data.
7	SOURCE		22	RCOM3	Input/output terminals of audio signal of right channel. Control the analogue switch at the serial data.
8	TAPE-2		23	TAPE-2	
9	LCOM3		24	SOURCE	
10	TAPE-2'		25	RCOM2	
11	LCOM4	Input/output terminals of multi source of left channel. Control the analogue switch at the serial data.	26	PHONO	
12	Vss	Negative power supply terminal (-15V)	27	CD	
13	CE	Chip enable terminal. Connect to the terminal FUNC of the microprocessor.	28	RCOM1	Input/output terminals of multi source of right channel.
14	DI	Serial data input terminal. Connect to the terminal DATA of the microprocessor.	29	CD'	Control the analogue switch at the serial data.
15	CL	Serial clock input terminal. Connect to the terminal CL of the microprocessor.	30	PHONO'	

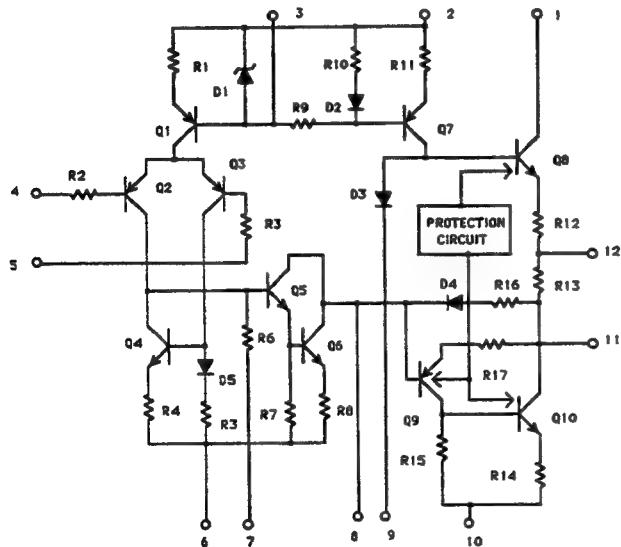
Q691

Pin No.	Terminal	Description	Pin No.	Terminal	Description
1	DOLBY	Input/output terminals of digital delay signal when surround mode. Control the analogue switch at the serial data.	16	VEE	Ground terminal
2	HALL		17	S	Selector terminal
3	LCOM1		18	RES	Reset terminal. When power is turned on, the condition of the analogue switch is not determined, but when this terminal is "L", all analogue switches are off.
4	NORMAL	Mode select terminal when Dolby Pro Logic. Control the analogue switch at the serial data.	19	VDD	Power supply terminal (+15V)
5	WIDE		20	NC	Not used.
6	LCOM2		21	NC	
7	TEST B		22	NC	
8	TEST A		23	NC	
9	LCOM3		24	NC	
10	TEST		25	NC	
11	LCOM4		26	NC	
12	Vss	Negative power supply terminal (-15V)	27	NC	
13	CE	Chip enable terminal. Connect to the terminal FUNC of the microprocessor.	28	NC	
14	DI	Serial data input terminal. Connect to the terminal DATA of the microprocessor.	29	NC	
15	CL	Serial clock input terminal. Connect to the terminal CL of the microprocessor.	30	NC	

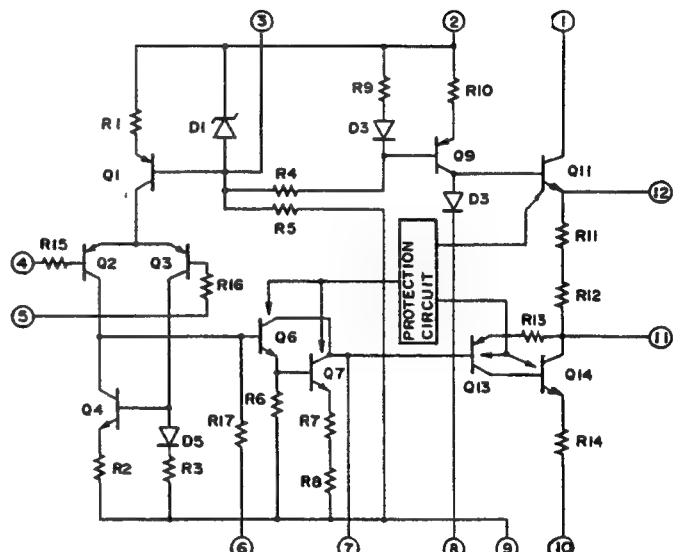
Q451
TC9213P (Electro Volume)



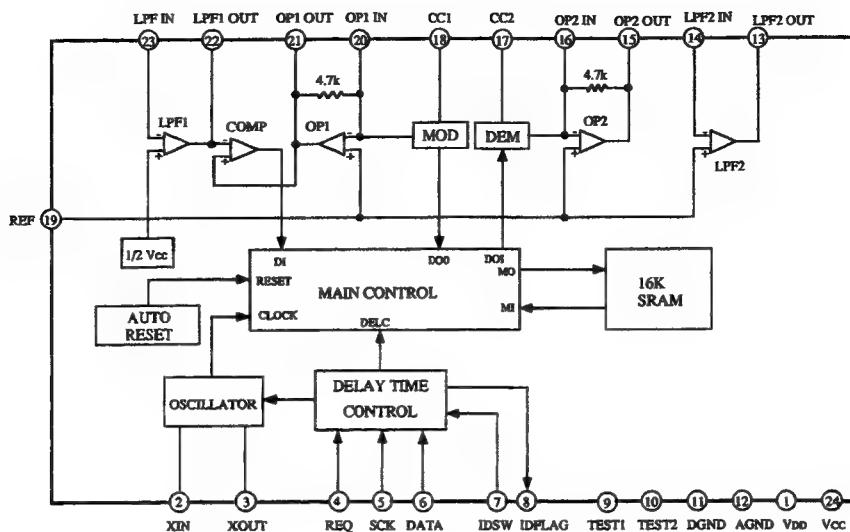
Q501, Q502, Q541
 μ PC1298V (Power Amplifier Driver)



Q571, Q572
 μ PC1225H

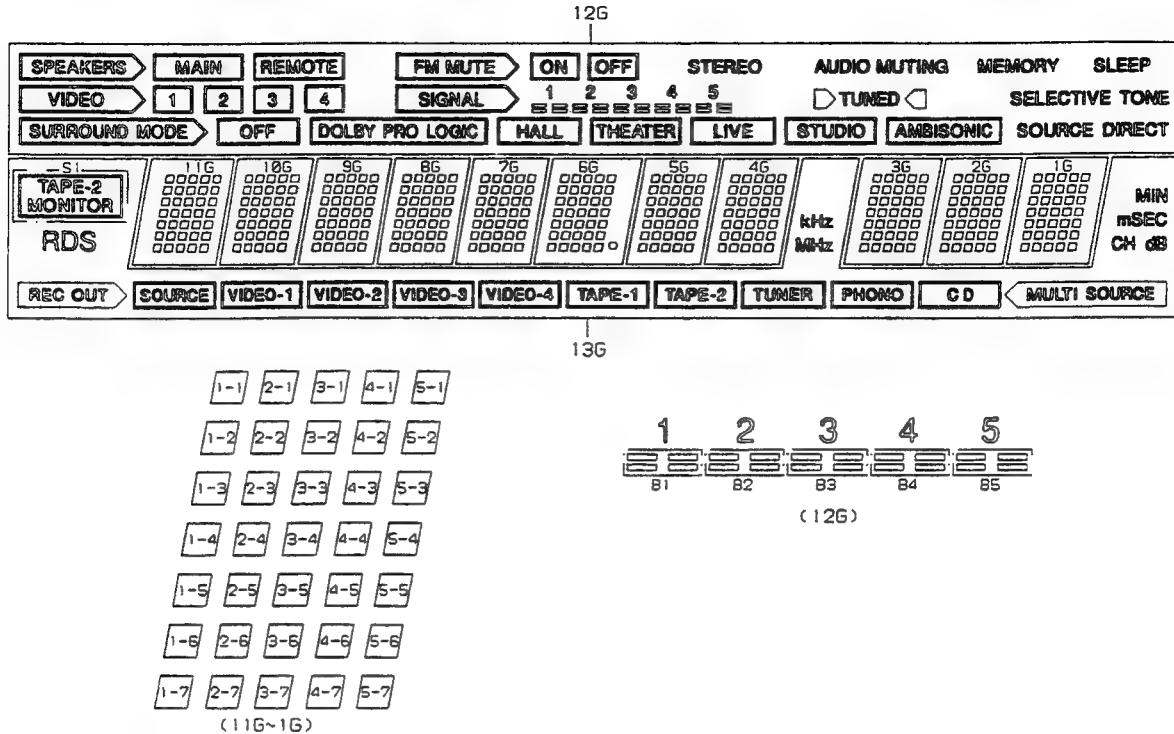


Q661
M65830P (Digital Delay)



Pin No.	Mark	Function	I/O	Description
1	VDD	Digital power supply	-	
2	XIN	Resonator input	I	Connect the 2MHz ceramic resonator
3	XOUT	Resonator output	O	
4	REQ	Request	I	Data request input
5	SCK	Shift lock	I	Serial data shift clock input
6	DATA	Data	I	Serial data input
7	IDSW	ID switch	I	External input of 4th bit of ID code
8	IDFLAG	ID flag	O	Data input confirmation pulse and serial data output
9	TEST1	Test 1	-	Normal mode when low level
10	TEST2	Test 2	-	Normal mode when low level
11	D GND	Digital ground	-	
12	A GND	Analog ground	-	
13	LPF2 OUT	LPF filter 2 output	O	
14	LPF2 IN	LPF filter 2 input	I	
15	OP2 OUT	Operation amp. 2 output	O	
16	OP2 IN	Operation amp. 2 input	I	
17	CC2	Current control 2	-	Demodulation ADM control
18	CC1	Current control 1	-	Modulation ADM control
19	REF	Reference	-	Analog reference voltage=1/2VCC
20	OP1 IN	Operation amp. 1 input	I	
21	OP1 OUT	Operation amp. 1 output	O	
22	LPF1 OUT	LPF filter 1 output	O	
23	LPF1 IN	LPF filter 1 input	I	
24	VCC	Analog power supply	-	

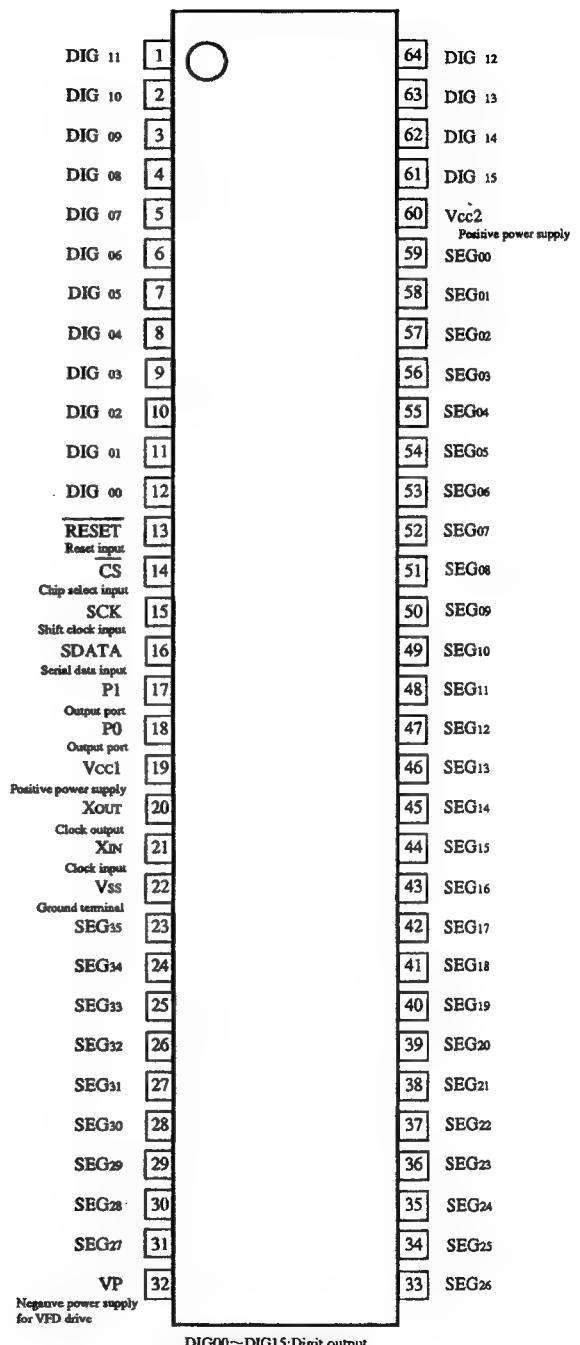
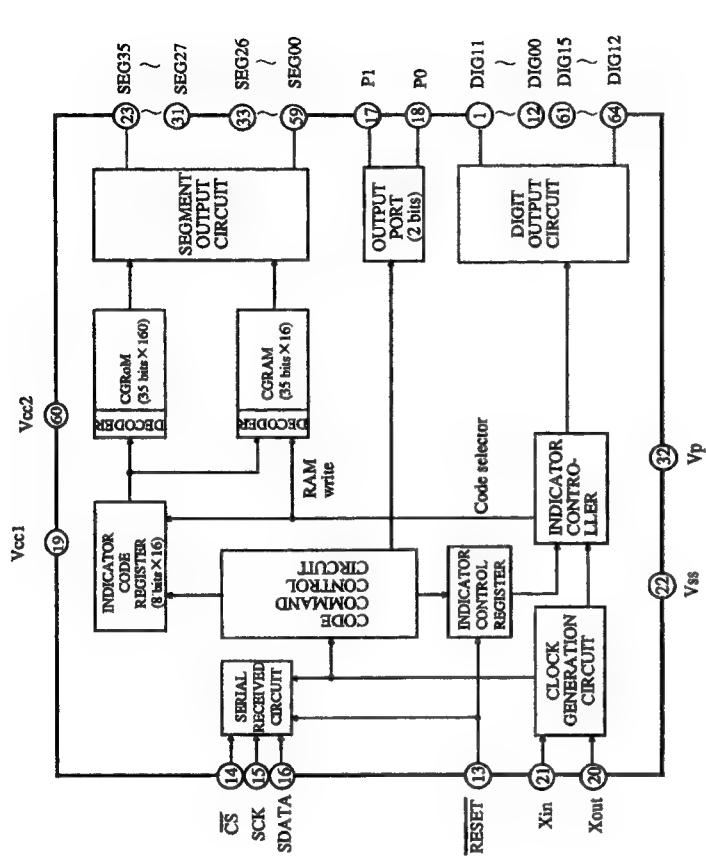
Q703
13-BT-131GK (Fluorescent Indicator Tube)



	13G	12G	11G~7G	6G	5G~1G
P1	MIN	SLEEP		1-1	1-1
P2	msSEC	MEMORY		2-1	2-1
P3	dB	AUDIO MUTING		3-1	3-1
P4	CH	SELECTIVE TONE		4-1	4-1
P5	MULTI SOURCE	SOURCE DIRECT		5-1	5-1
P6	REC OUT	TUNED		1-2	1-2
P7	SOURCE	□		2-2	2-2
P8	(SOURCE)	STEREO		3-2	3-2
P9	VIDEO-1	OFF (Center)		4-2	4-2
P10	(VIDEO-1)	ON		5-2	5-2
P11	VIDEO-2	FM MUTE		1-3	1-3
P12	(VIDEO-2)	AMBISONIC		2-3	2-3
P13	VIDEO-3	STUDIO		3-3	3-3
P14	(VIDEO-3)	LIVE		4-3	4-3
P15	VIDEO-4	THEATER		5-3	5-3
P16	(VIDEO-4)	HALL		1-4	1-4
P17	TAPE-1	DOLBY PRO LOGIC		2-4	2-4
P18	(TAPE-1)	OFF (LEFT)		3-4	3-4
P19	TAPE-2	SURROUND MODE		4-4	4-4
P20	(TAPE-2)	1 2 3 4 5		5-4	5-4
P21	TUNER	B5		1-5	1-5
P22	(TUNER)	B4		2-5	2-5
P23	PHONO	B3		3-5	3-5
P24	(PHONO)	B2		4-5	4-5
P25	CD	B1		5-5	5-5
P26	(CD)	SIGNAL		1-6	1-6
P27	kHz	REMOTE		2-6	2-6
P28	MHz	MAIN		3-6	3-6
P29	SI	SPEAKERS		4-6	4-6
P30	RDS	4		5-6	5-6
P31		3		1-7	1-7
P32		2		2-7	2-7
P33		1		3-7	3-7
P34		VIDEO		4-7	4-7
P35				5-7	5-7
P36				○	

PIN NO.	64	63	62	61	60	59	58	57
CONNECTION	F2	F2	NP	NP	P36	P35	P34	P33
PIN NO.	56	55	54	53	52	51	50	49
CONNECTION	P32	P31	P30	P29	P28	P27	P26	P25
PIN NO.	48	47	46	45	44	43	42	41
CONNECTION	P24	P23	P22	P21	P20	P19	P18	P17
PIN NO.	40	39	38	37	36	35	34	33
CONNECTION	P16	P15	P14	P13	P12	P11	P10	P9
PIN NO.	32	31	30	29	28	27	26	25
CONNECTION	P8	P7	P6	P5	P4	P3	P2	P1
PIN NO.	24	23	22	21	20	19	18	17
CONNECTION	NC	NC	NC	NC	NC	NC	NC	13G
PIN NO.	16	15	14	13	12	11	10	9
CONNECTION	12G	11G	10G	9G	8G	7G	6G	5G
PIN NO.	8	7	6	5	4	3	2	1
CONNECTION	4G	3G	2G	1G	NP	NP	F1	F1

Q702
 μ M6604FP (FL tube Driver)

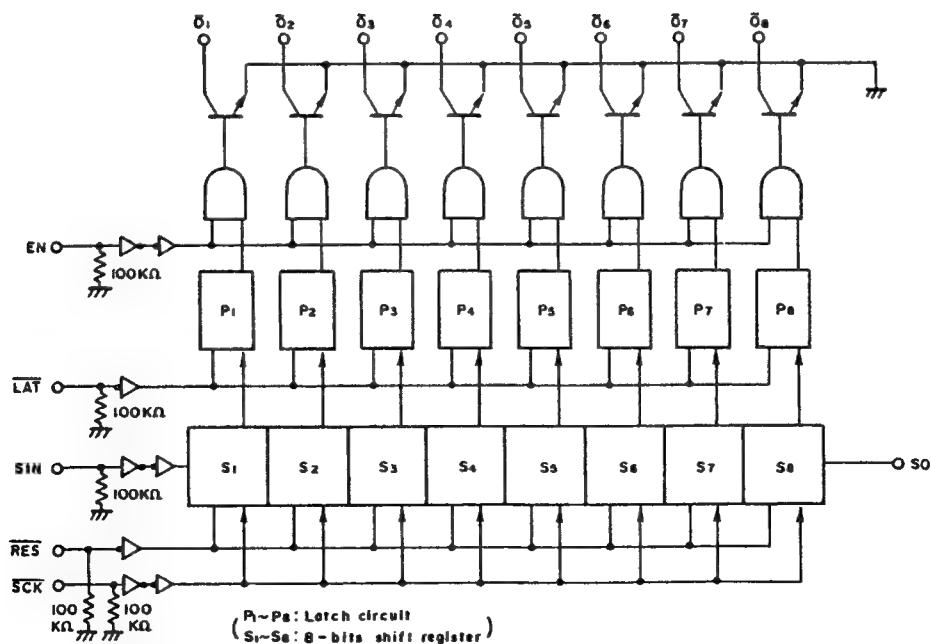


DIG00~DIG15: Digit output
 SEG00~SEG35: Segment output

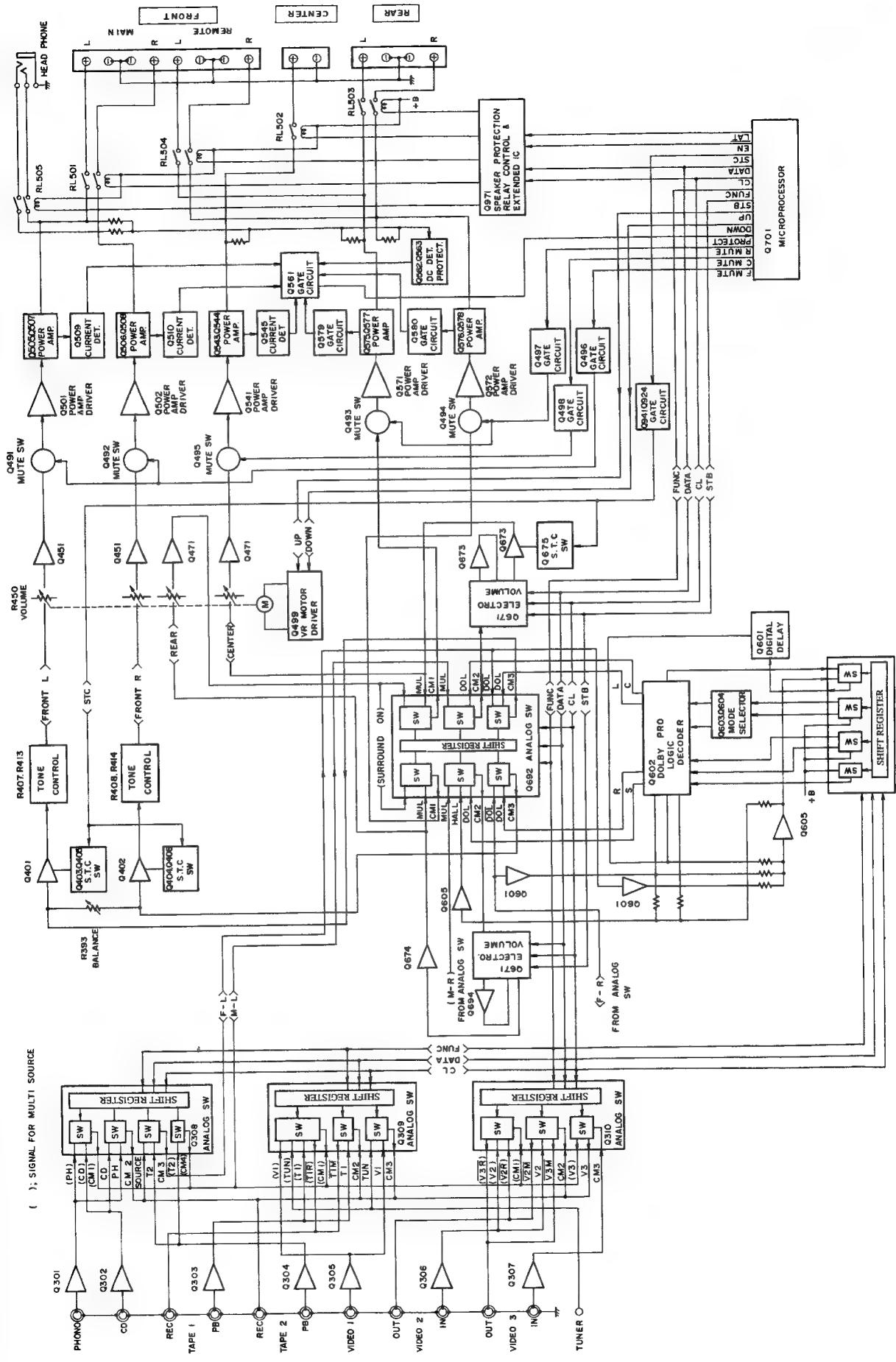
Q971
 μ PD6345C (Extended IC)

VSS	1		16	VDD
EN	2		15	RES
LAT	3		14	SCK
SO	4		13	SIN
08	5		12	01
07	6		11	02
06	7		10	03
05	8		9	04

Pin No.	Symbol	Description
1	VSS	Ground terminal
2	EN	Chip enable input terminal. Connect to the terminal EN of the microprocessor.
3	\overline{LAT}	Latch input terminal. Connect to the terminal LAT of the microprocessor.
4	SO	Serial data output terminal. Not used.
5	$\overline{O8}$	Not used.
6	$\overline{O7}$	Not used.
7	$\overline{O6}$	Front speaker relay control output terminal
8	$\overline{O5}$	Center speaker relay control output terminal
9	$\overline{O4}$	Rear speaker relay control terminal
10	$\overline{O3}$	Remote speaker relay control terminal
11	$\overline{O2}$	Headphone relay control output terminal
12	$\overline{O1}$	Power supply voltage switch relay control output terminal
13	SIN	Serial data input terminal. Connect to the terminal DATA of the microprocessor.
14	SCK	Serial clock input terminal. Connect to the terminal CLOCK of the microprocessor.
15	\overline{RESET}	Reset input terminal
16	VDD	Power supply terminal

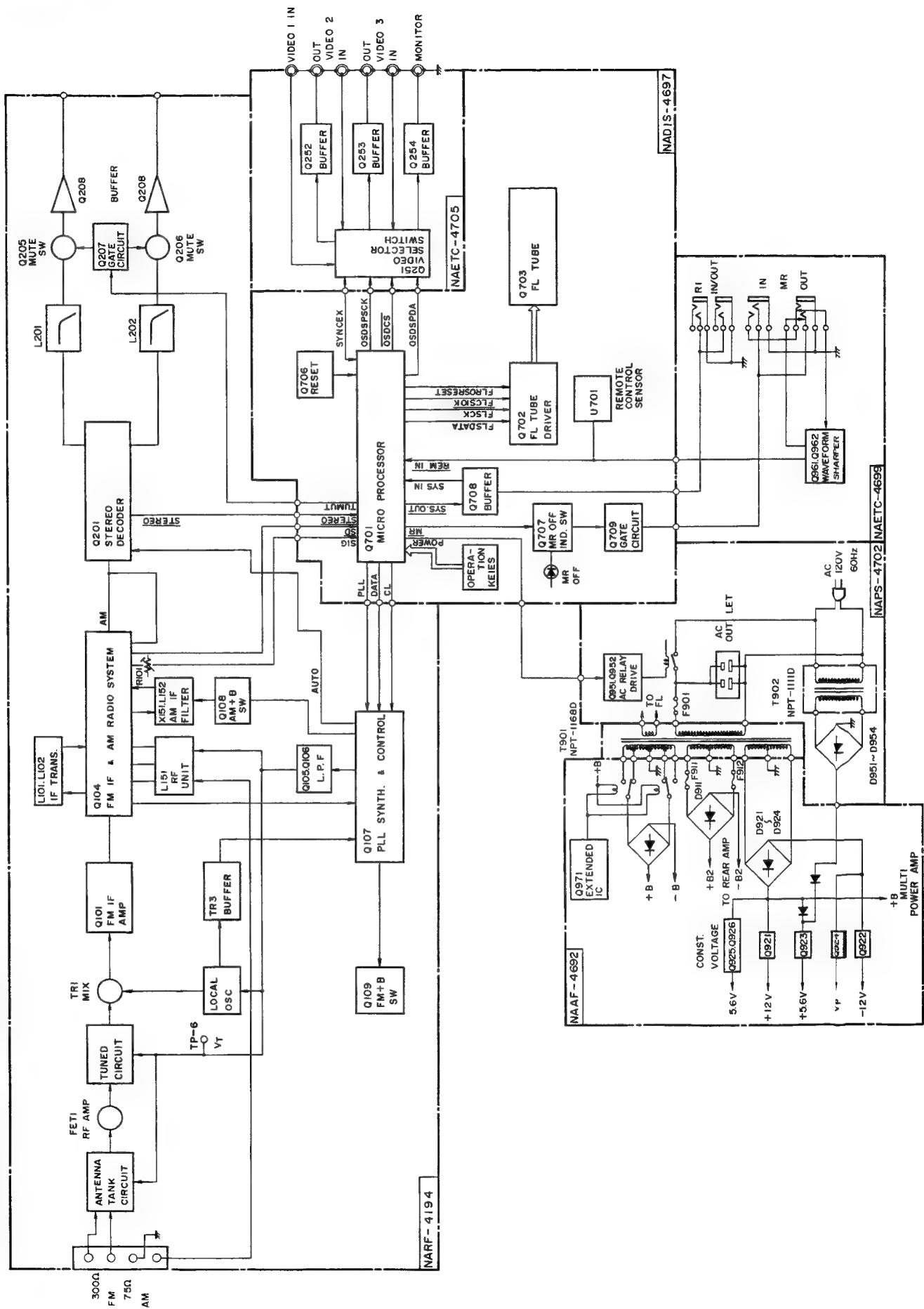


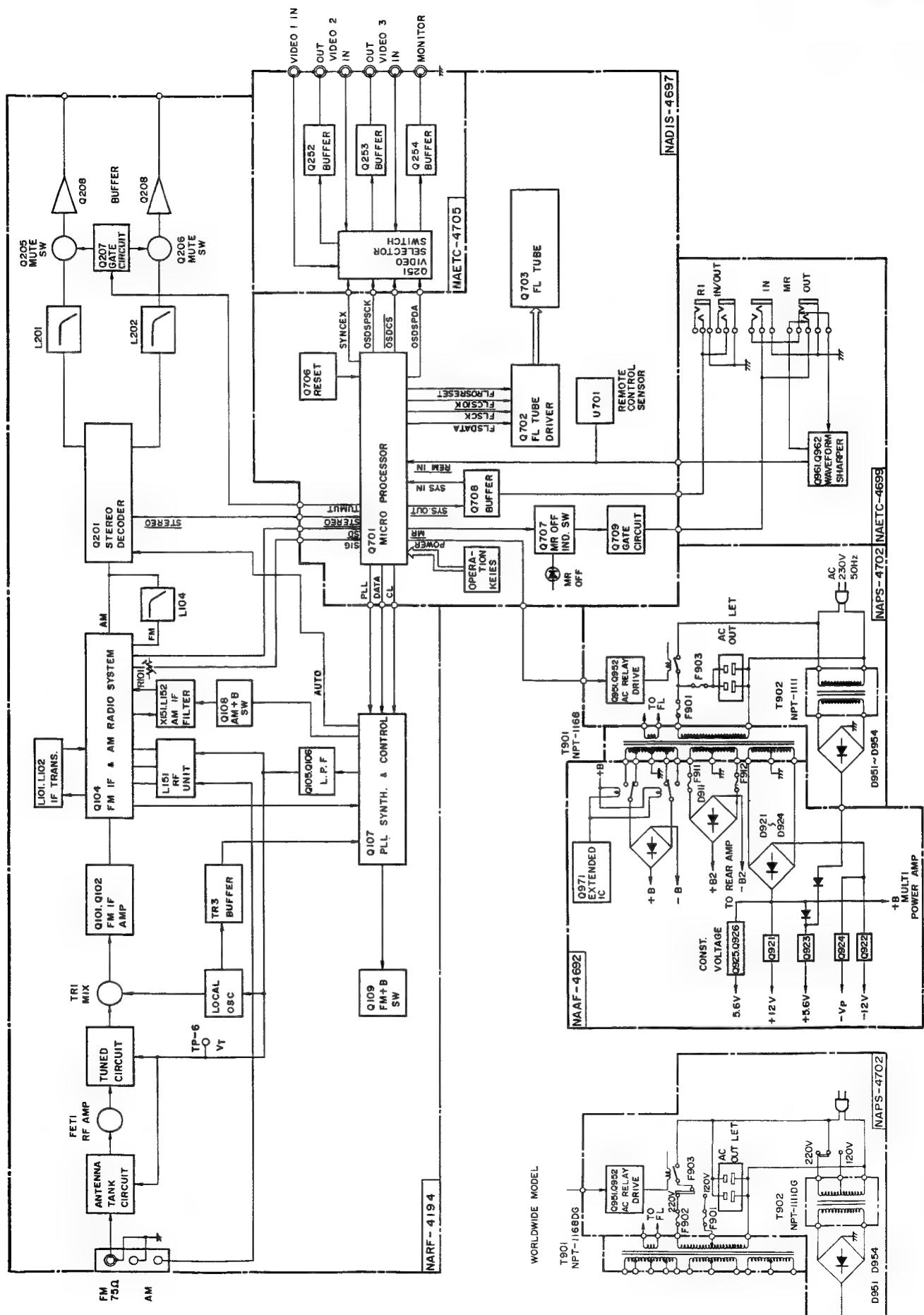
BLOCK DIAGRAM AMPLIFIER SECTION



BLOCK DIAGRAM

TUNER SECTION (120V model)





ADJUSTMENT PROCEDURES

• Preparation

1. Input

FM mono : 1 kHz, 75kHz devi., 60dB/ μ V
 FM stereo : 1 kHz, 75kHz devi., 60dB/ μ V
 Pilot signal 19kHz 7.5kHz devi.
 AM : 400Hz 30% mod.

2. Outputs

Connect the non-inductive type resistors of 8ohms to the main speaker, remote speaker, and rear speaker terminals unless otherwise noted.

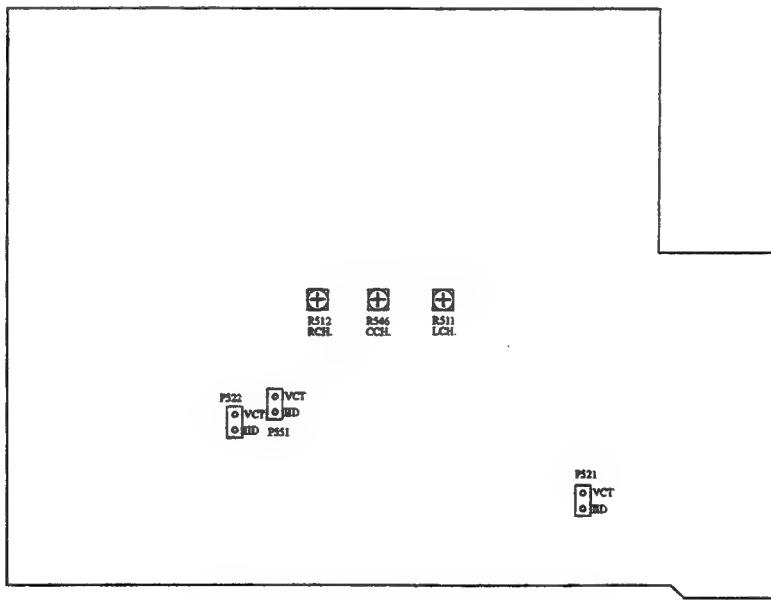
4. Standard Knob Position

TAPE MONITOR 2	.....	OFF
VOLUME	.....	Maximum
BASS/TREBLE/BALANCE	.....	Center
MUTING	.....	OFF
REC SELECTOR	.....	SOURCE
INPUT SELECTOR	.....	CD
SPEAKERS	.....	ON
S.T.C.	.....	OFF

3. Initializing of unit

1. Press and hold down the CD button, then press the POWER button.
2. "Test-" is displayed on the display for approximately 5 seconds.
3. While "Test-" is displayed, unplug the TX-SV515PROs power cord from its AC outlet, then "Test-" will disappear.
4. Preset memory and parameters stored in memory, such as surround are initialized and will return to the factory settings.

SURROUND MODE	.....	OFF
CENTER MODE	.....	WIDE
DELAY TIME	.....	20mS
MULTI/REAR LEVEL	.....	Center
MR OFF	.....	ON



MAIN CIRCUIT PC BOARD

Amplifier section

Idling Current Adjustment

Connect the DC voltmeter to the terminals P521, P522, and P551 (VCT and IID) on the main circuit pc board.

Adjust the trim resistors R511, R512 and R546 so that the indicator of voltmeter becomes 5 ± 0.5 mV.

NOTE: Adjust after switching on for 5 minutes.

FM section

Item	Step	Connection of instrument	FM SG output	Stereo modulator output	Tuning frequency	Output indicator	Adjustment point	Adjust for	Remarks
FM IF/RF	1	Fig.1	99.1MHz 1kHz 75kHz devi. 65dBf(60dB)	—	99.1MHz	DC voltmeter	L101	$0 \pm 20mV$	FM MUTE/MODE switch:ON/STEREO Repeat the steps 1 and 3 until no further adjustment is necessary.
	2					AC voltmeter	IFT on the front end	Maximum	
	3					Distortion analyzer	L102	Minimum	
VCO		Fig.2	99.1MHz 1kHz 75kHz devi. 65dBf(60dB)	—	99.1MHz	Frequency counter	R201	$19kHz \pm 10Hz$	
Stereo Distortion		Fig.3	99.1MHz Ext. mod. 65dBf(60dB)	Channel L or R 1kHz	99.1MHz	Distortion analyzer	IFT on the front end	Minimum	Don't turn more than $\pm 180^\circ$
Stereo Separation	1	Fig.3	99.1MHz Ext. mod. 65dBf(60dB)	Channel L 1kHz	99.1MHz	Channel R AC voltmeter	R202	Minimum	Maximum and same separation
	2			Channel R 1kHz		Channel L AC voltmeter		Minimum	
Muting Level		Fig.3	99.1MHz 17.2dBf(12dB) <19.2dBf(14dB)>	—	99.1MHz	Oscilloscope	R101	Signal output	

NOTE:< >:230V and Worldwide models

AM section

120V model

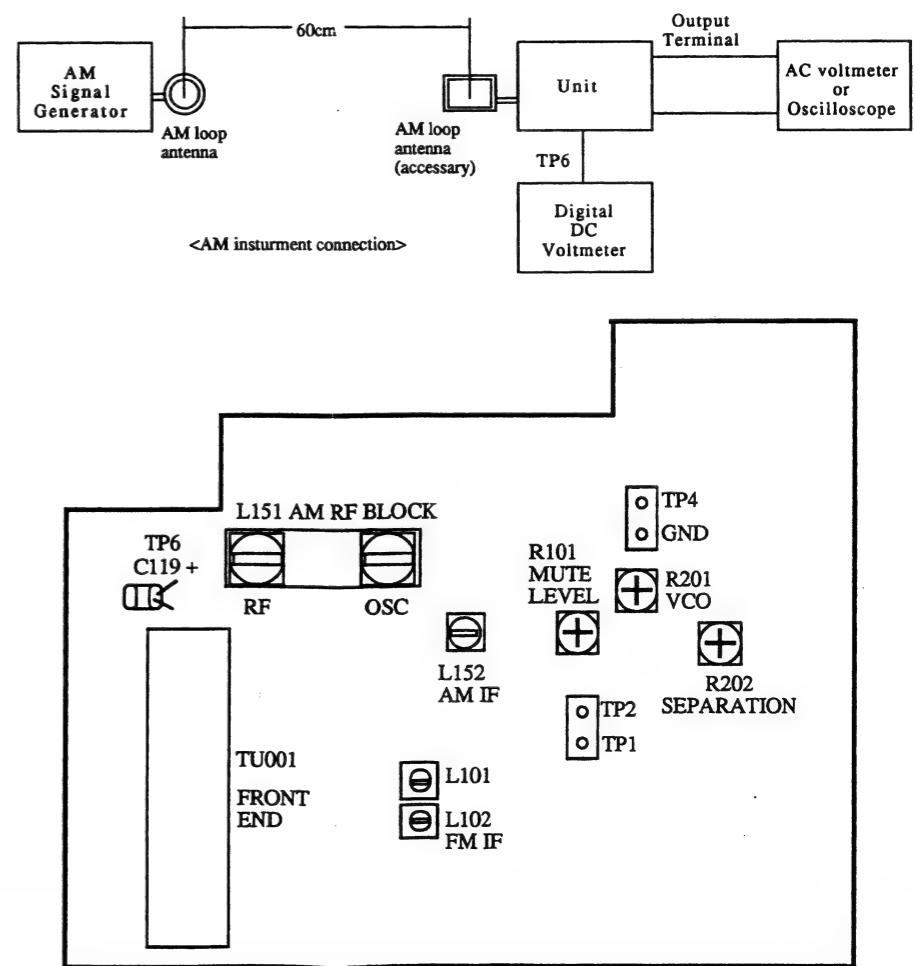
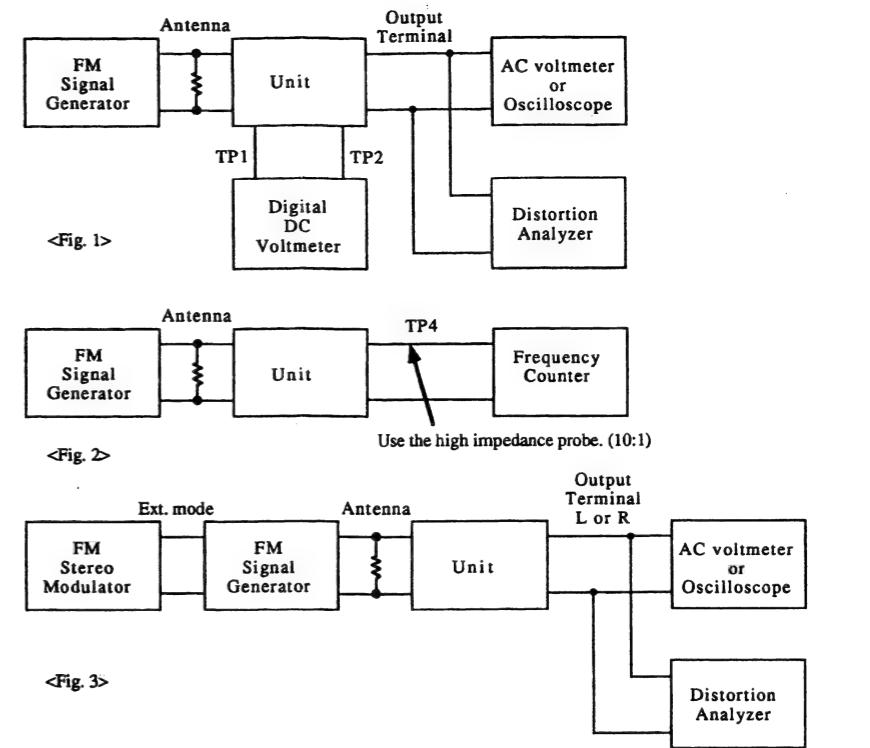
Step	AM SG output	Tuning Frequency	Output Indicator	Adjustment point	Adjust for
1		530kHz	Digital DC voltmeter	OSC coil on RF block L151	$1.4 \pm 0.2V$
2	600kHz 400Hz 30% mod. 60dB/m	600kHz	AC voltmeter	RF coil on RF block L151	Maximum
3	990kHz 400Hz 30% mod. 60dB/m	990kHz	AC voltmeter	L152	Maximum

230V and Worldwide models

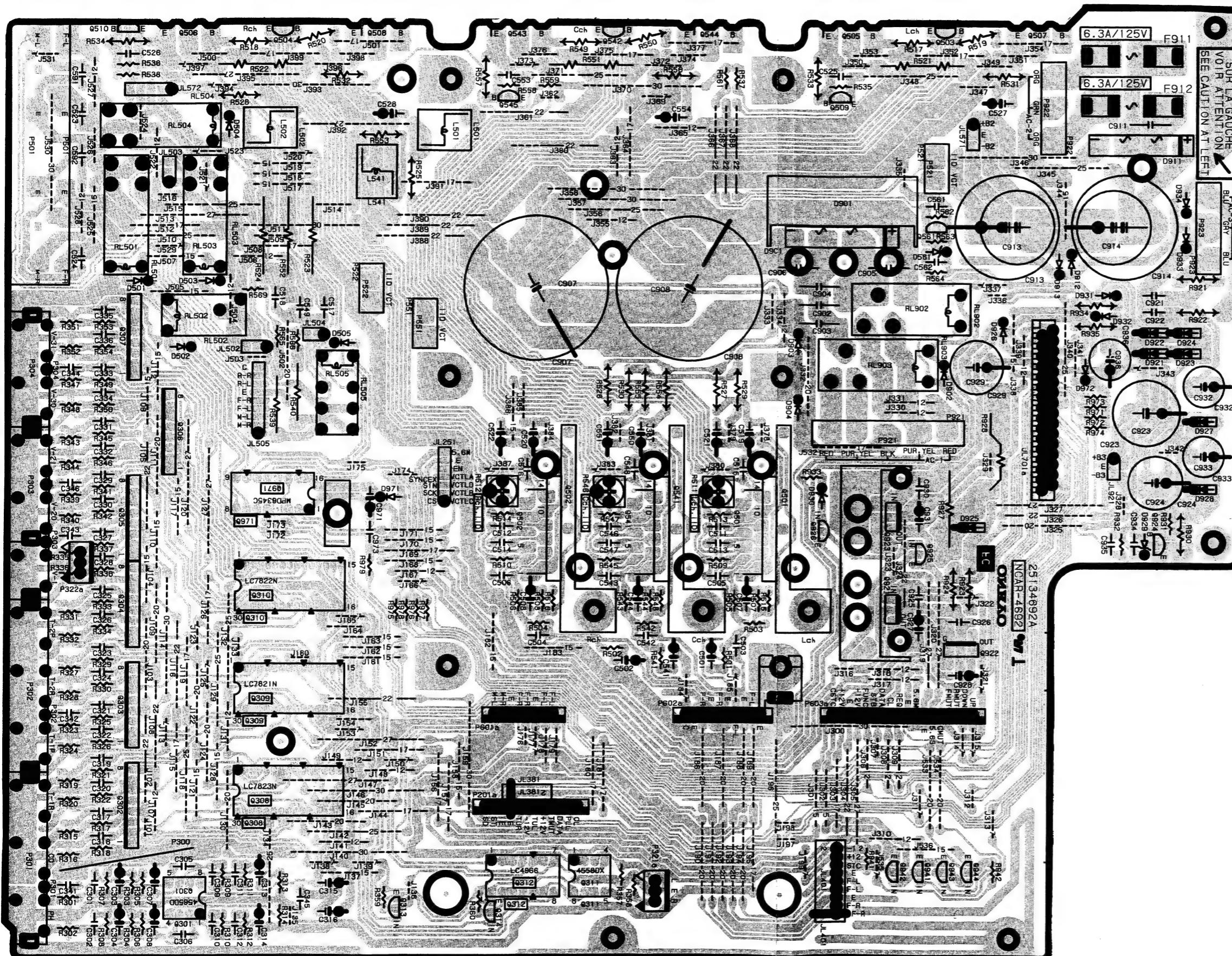
Step	AM SG output	Tuning Frequency	Output Indicator	Adjustment point	Adjust for
1		522kHz or 531kHz	Digital DC voltmeter	OSC coil on RF block L151	$1.3 \pm 0.2V$
2	603kHz 400Hz 30% mod. 60dB/m	603kHz	AC voltmeter	RF coil on RF block L151	Maximum
3	999kHz 400Hz 30% mod. 60dB/m	999kHz	AC voltmeter	L152	Maximum

Reference Specification
 FM tuned voltage: 87.9MHz-107.9MHz
 More than 1.3V-Less than 10V
 AM tuned voltage: 530kHz-1710kHz
 $1.4 \pm 0.2V$ -Less than 9.0V

Reference Specification
 FM tuned voltage: 87.5MHz-108MHz
 More than 1.3V-Less than 10V
 AM tuned voltage: 522kHz-1611kHz
 $1.3 \pm 0.2V$ -Less than 9.0V
 (230V model)
 AM tuned voltage: 531kHz-1602kHz
 $1.3 \pm 0.2V$ -Less than 9.0V
 (Worldwide model)



PRINTED CIRCUIT BOARD VIEW FROM BOTTOM SIDE



MAIN CIRCUIT PC BOARD

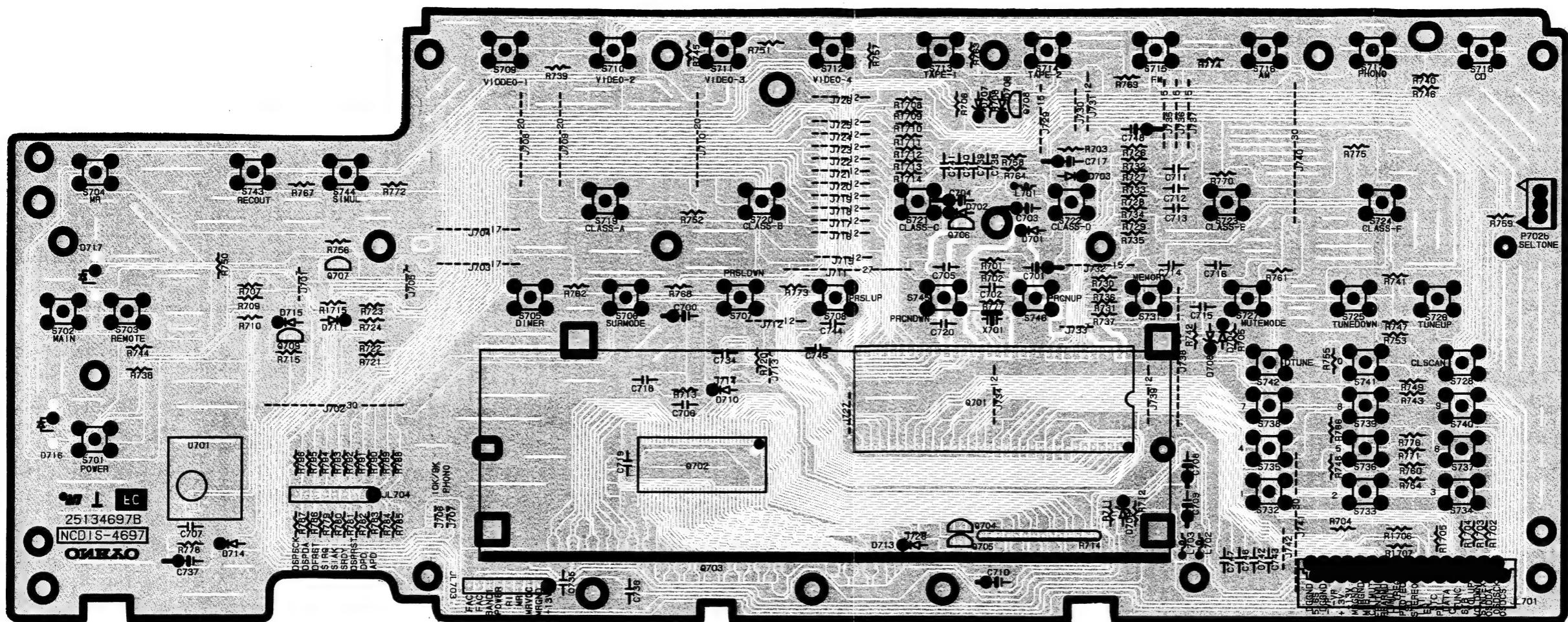
A rectangular component label with a black border. Inside, the text 'ONKYO' is at the top in a large, bold, sans-serif font. Below it, 'JL-502' is in a smaller bold font. In the center, there is a small rectangular cutout containing a black tab. To the right of the cutout, the text '25134693' and 'NCETC-4693' is stacked vertically. Below that, 'C552 P502' is printed. At the bottom right, 'PS02' is printed. The label is oriented vertically.

CENTER SPEAKER TERMINAL PC BOARD

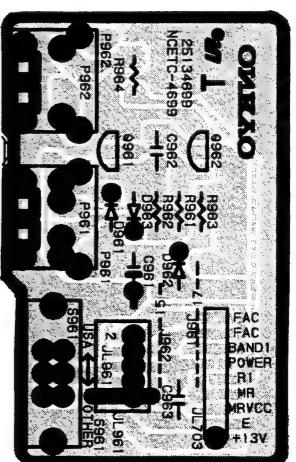
SPEAKER TERMINAL PC BOARD

HEADPHONE TERMINAL PC BOARD

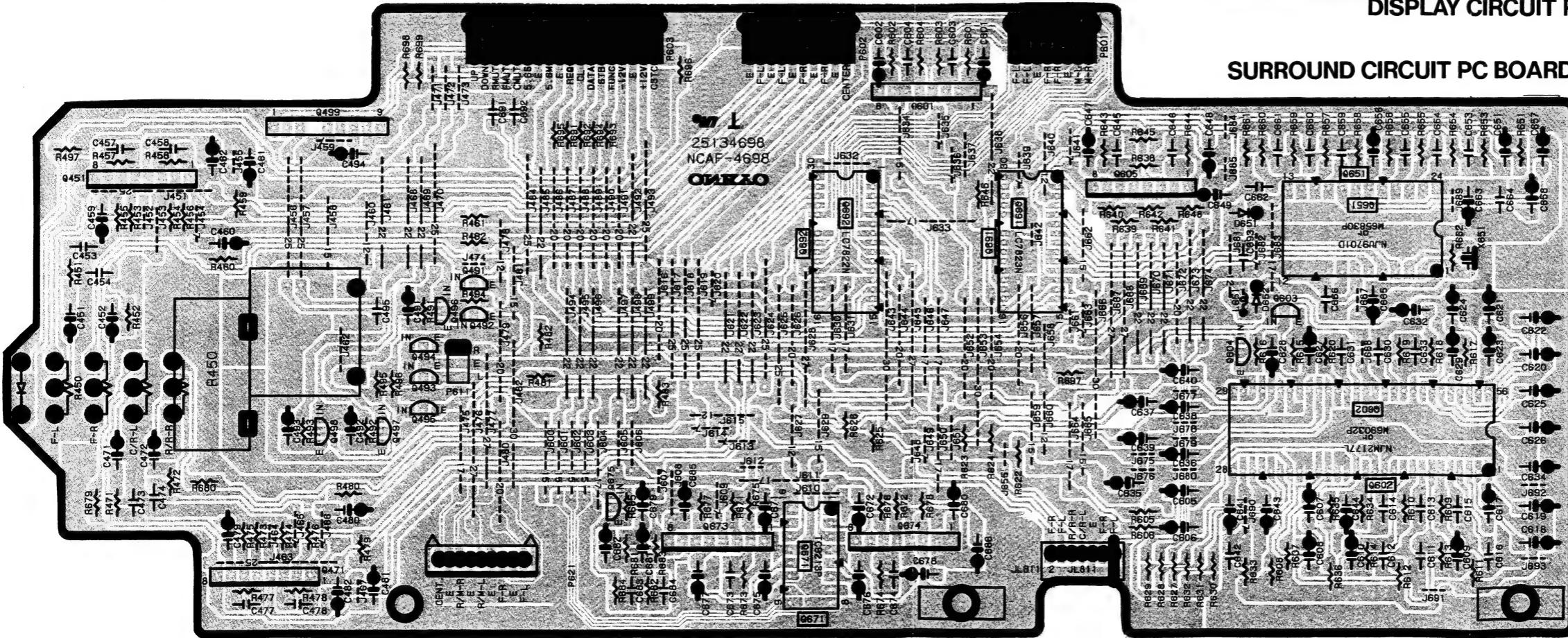
STC SWITCH PC BOARD



DISPLAY CIRCUIT PC BOARD



SURROUND CIRCUIT PC BOARD



RI/MR TERMINAL PC BOARD

PRINTED CIRCUIT BOARD VIEW FROM BOTTOM SIDE

REAR AMPLIFIER PC BOARD

TONE CONTROL CIRCUIT PC BOARD

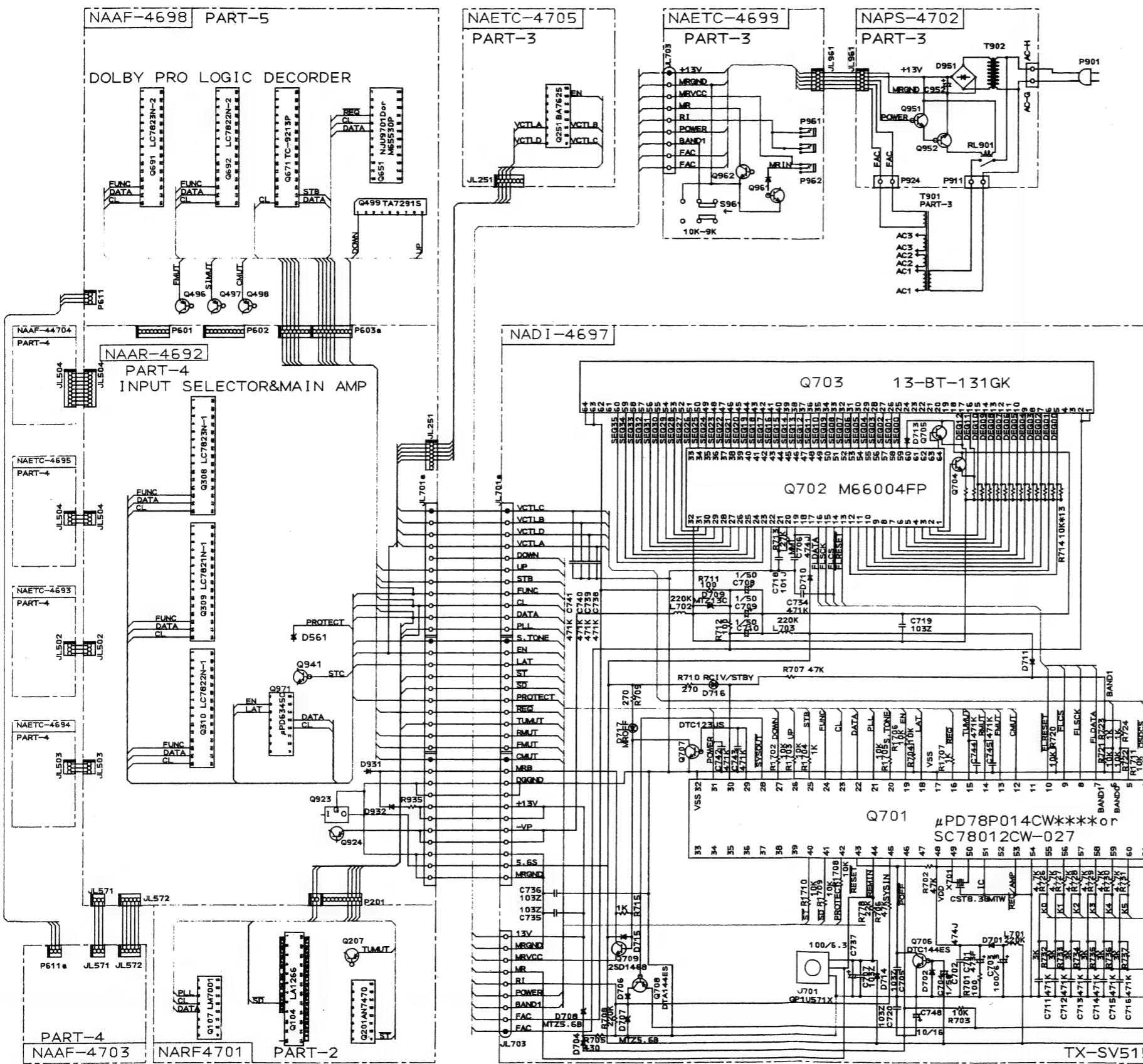
POWER SUPPLY CIRCUIT PC BOARD

VIDEO CIRCUIT PC BOARD

A B C D E F G

SCHEMATIC DIAGRAM (PART-1)
CONNECTION DIAGRAM OF MICROPROCESSOR

1



TX-SV515PRO/TX-SV9041 UD/MD/UP/MP/UW/MW/UQ/MQ

RC-202185

ONKYO CORPORATION

A

B

C

D

E

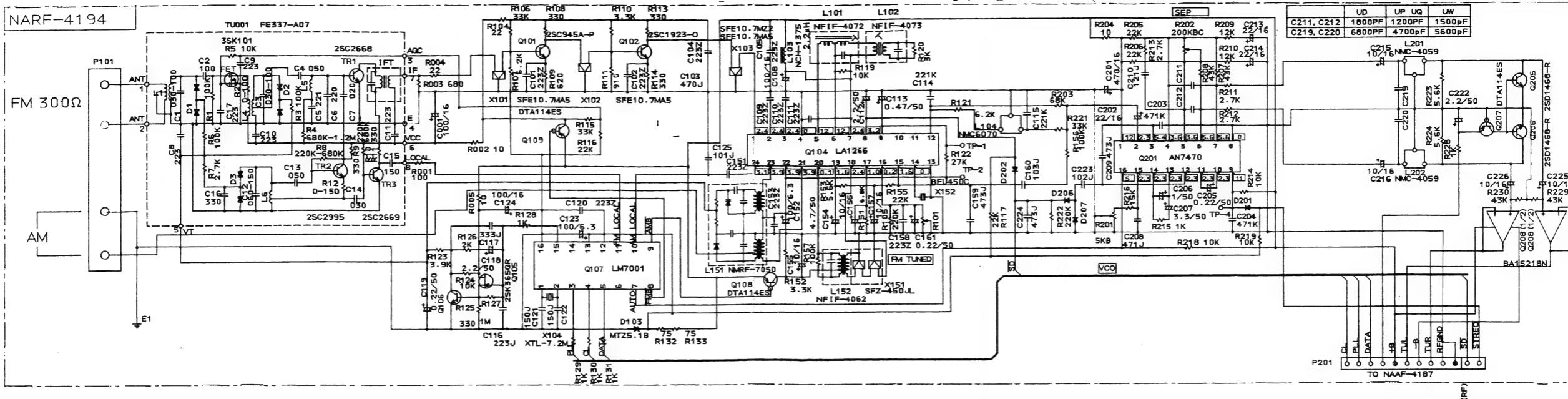
F

G

I

SCHEMATIC DIAGRAM (PART-2)

TUNER SECTION



A

B

C

D

E

F

G

SCHEMATIC DIAGRAM (PART-3)

POWER SUPPLY AND VIDEO SECTION

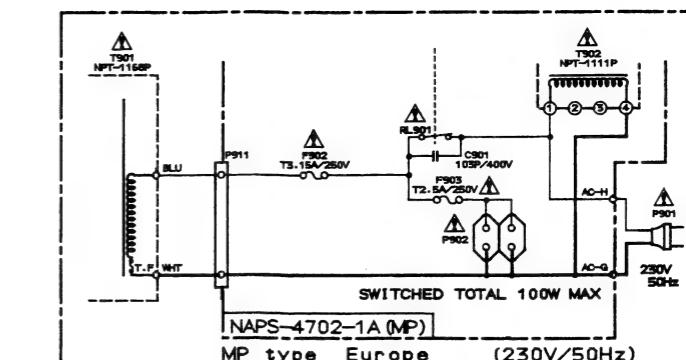
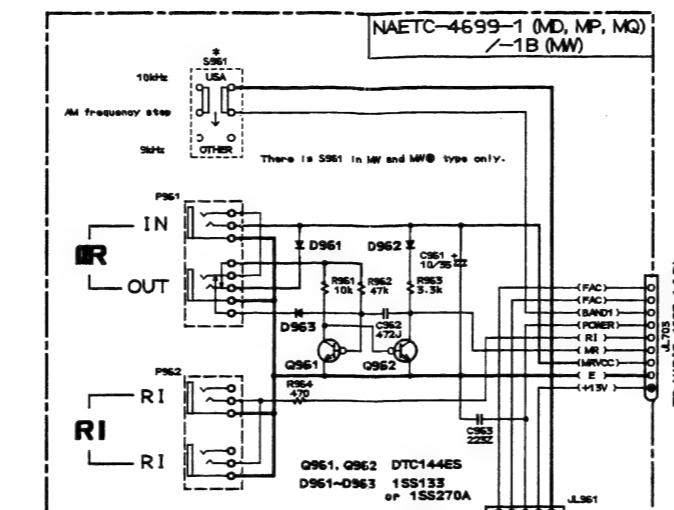
1

MD type : 120V/60Hz Area
 MD@ type : U.S.A.
 MD@ type : Canada

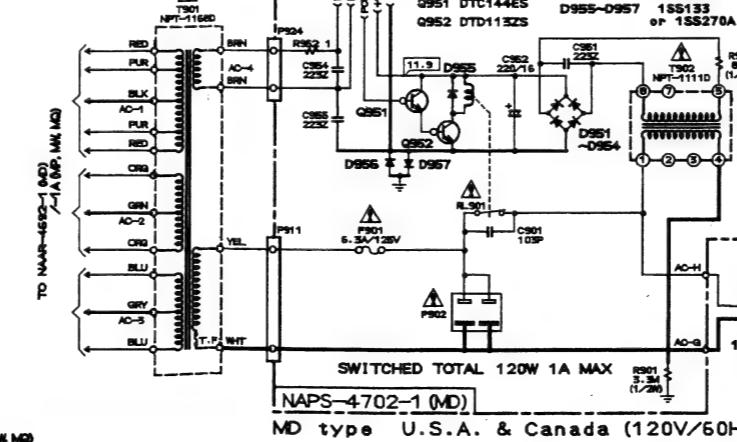
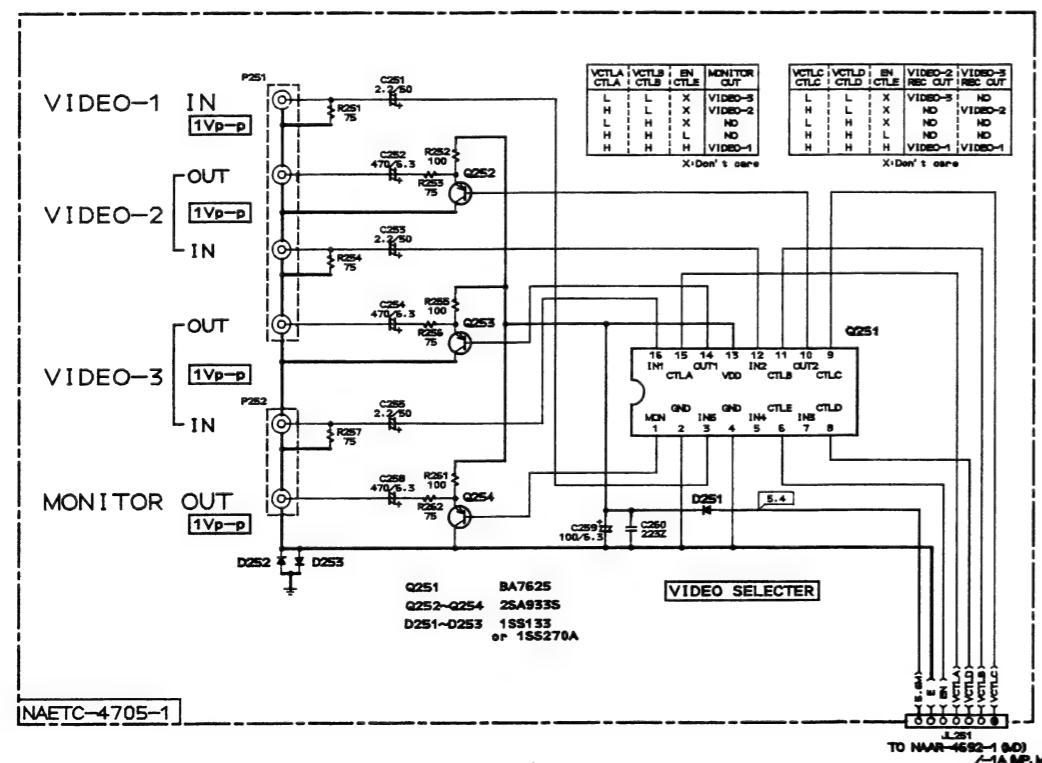
MP type : 230V/50Hz Area
 MP type : Europe (except for Germany)
 MP@ type : Germany (MODEL No. TX-SV9041)

MW type : 120V or 220V Switchable
 MW type : Worldwide
 MW@ type : For PX

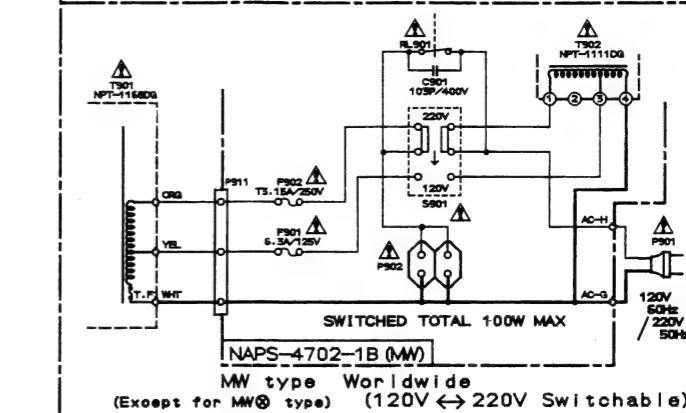
MQ type : 240V/50Hz Area
 MQ@ type : Australia



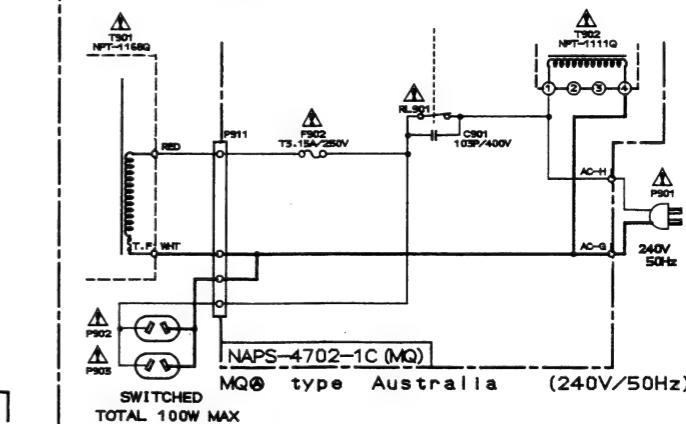
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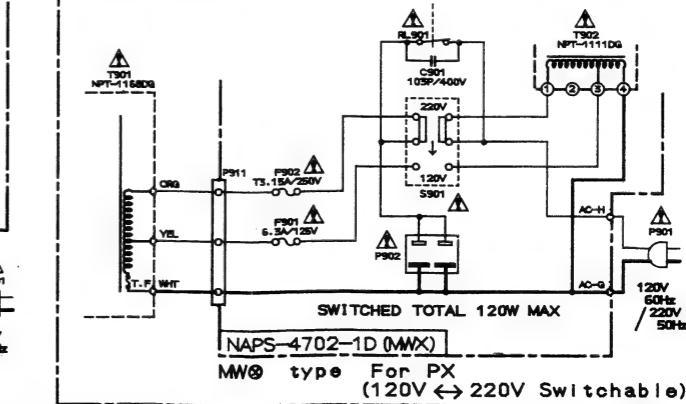
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4



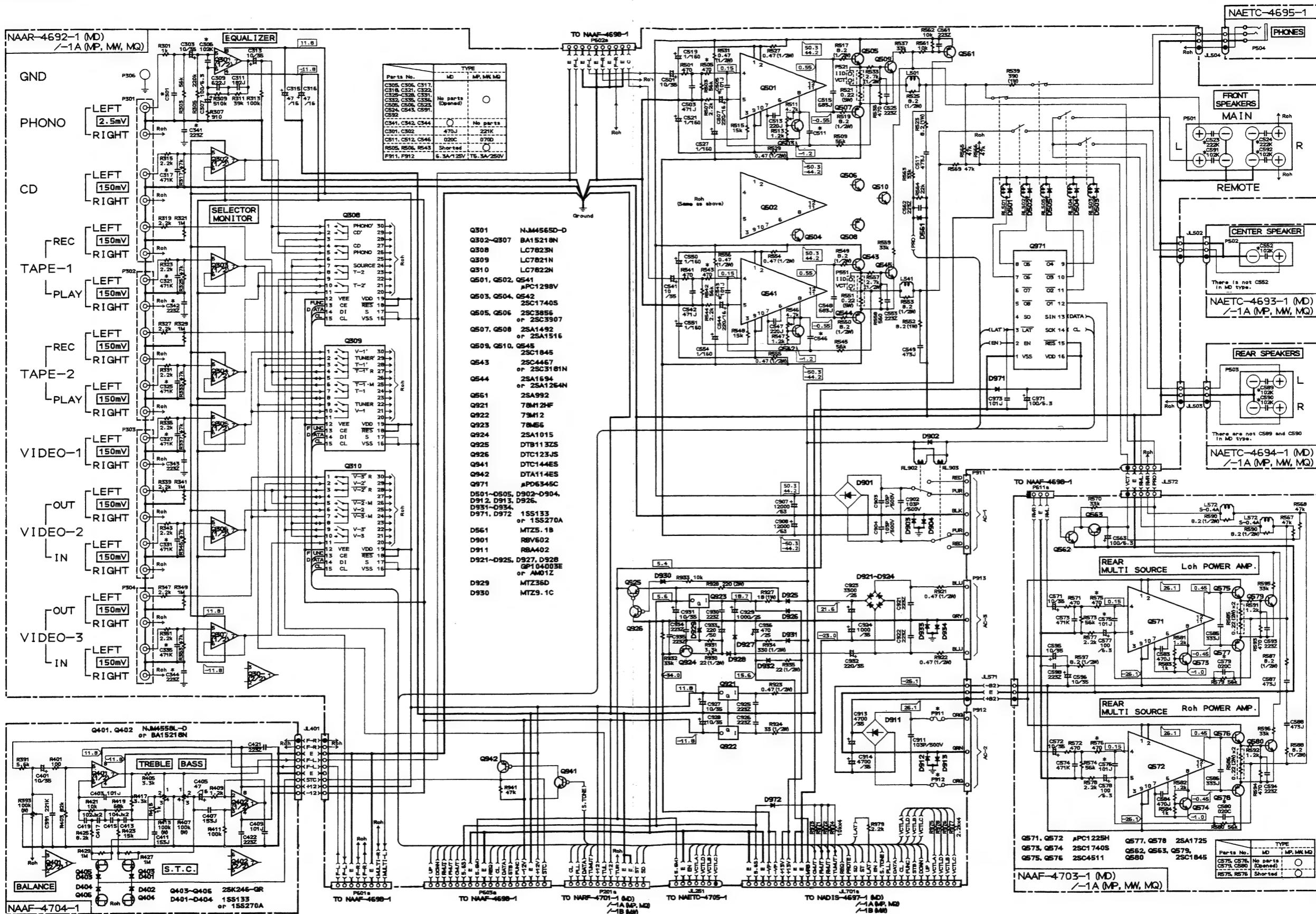
5



A B C D E F G

SCHEMATIC DIAGRAM (PART-4)

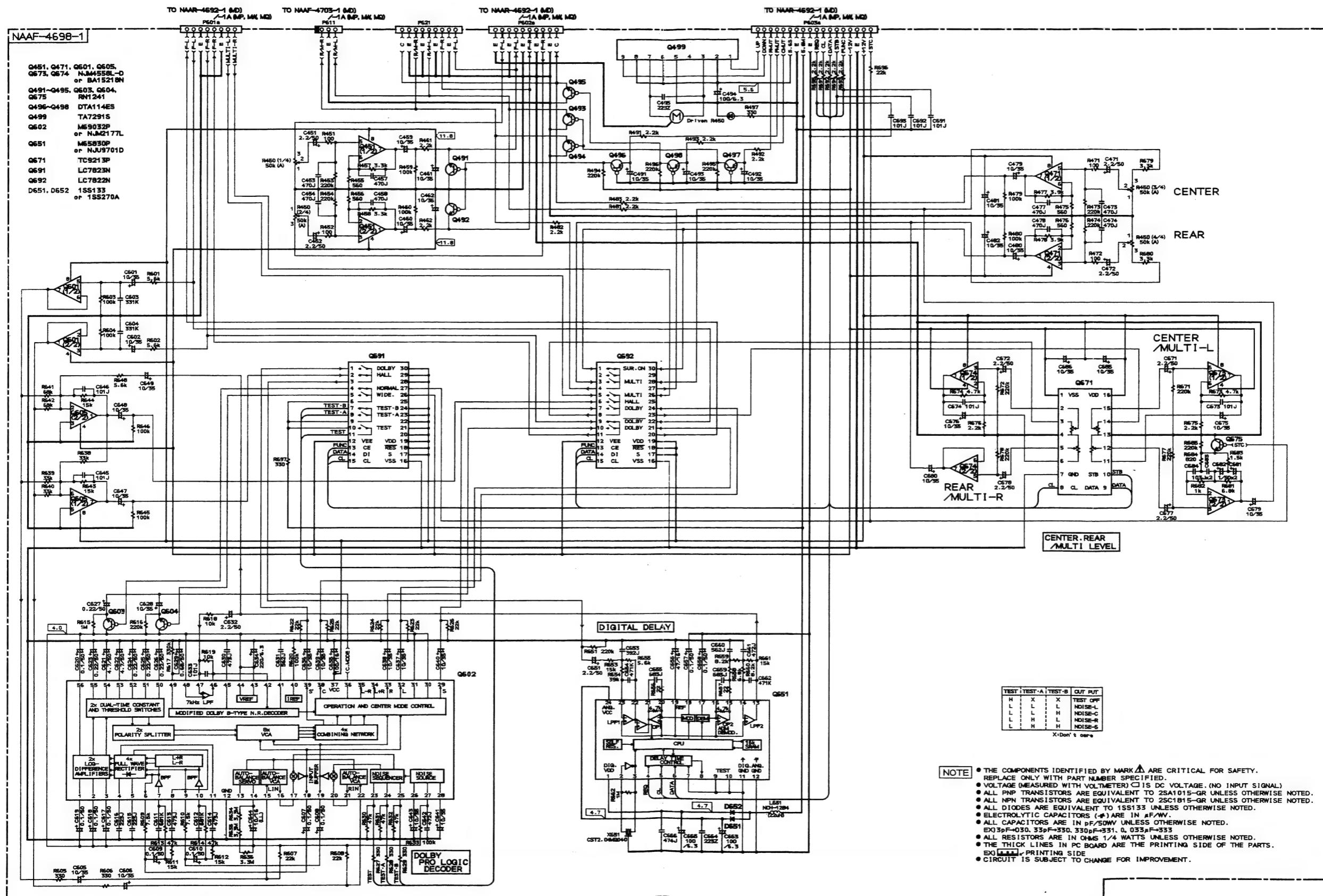
AUDIO SECTION



A B C D E F G

SCHEMATIC DIAGRAM (PART-5)

SURROUND SECTION



PRINTED CIRCUIT BOARD PARTS LIST

CAUTION: Replacement for transistor of mark *, if necessary,
must be made from the same beta group (H_{FE}) as
the original type.

NOTE: THE COMPONENTS IDENTIFIED BY MARK Δ
ARE CRITICAL FOR RISK OF FIRE AND
ELECTRIC SHOCK. REPLACE ONLY WITH
PART NUMBER SPECIFIED.

MAIN CIRCUIT PC BOARD (NAAR-4692-1/1A)

CIRCUIT NO.	PART NO.	DESCRIPTION	CIRCUIT NO.	PART NO.	DESCRIPTION
ICs					
Q301	22240191	NJM4565D-D	D912,D913	223205 or	1SS270A or
Q302-Q307	22240247	BA15218N	D926	223163	1SS133
Q308	22240339	LC7823N	D921-D925	22380046 or	AM01Z or
Q309	22240280	LC7821N	D927,D928	22380035	GP104003E
Q310	22240270	LC7822N	D929	224453604	MTZ36D
Q501,Q502	22240311	μ PC1298V	D930	224450913	MTZ9.1C
Q541	22240311	μ PC1298V	D931-D934	223205 or	1SS270A or
Q921	222780125NEC	78M12HF	D971,D972	223163	1SS133
Q922	222790125	79M12			Coils
Q923	222780565JRC	78M56	L501,L502	231209S	S-0.4A
Q971	22240211	μ PD6345C	L541	231209S	S-0.4A
Transistors					
Q503,Q504	2213284	2SC1740S-R	C303,C304	354761009	10 μ F,35V,Elect.
Q505,Q506	2201653,*	2SC3856-O,	C307,C308	354721019	100 μ F,6.3V,Elect.
2201654,*	2SC3856-Y,	C309,C310	374726224	6200pF \pm 5%,50V,Plastic	
2201655,*	2SC3856-P,	C311,C312	374721824	1800pF \pm 5%,50V,Plastic	
2202272 or	* 2SC3907-R or	C313,C314	354761009	10 μ F,35V,Elect.	
2202273	* 2SC3907-O	C315,C316	354744709	47 μ F,16V,Elect.	
Q507,Q508	2201663,*	2SA1492-O,	C501,C502	354761009	10 μ F,35V,Elect.
2201664,*	2SA1492-Y,	C503,C504	374724714	470pF \pm 5%,50V,Plastic	
2201665,*	2SA1492-P,	C507,C508	354742219	220 μ F,16V,Elect.	
2202262 or	* 2SA1516-R or	C515,C516	374726834	0.068 μ F \pm 5%,50V,Plastic	
2202263	* 2SA1516-O	C517,C518	374724734	0.047 μ F \pm 5%,50V,Plastic	
Q509,Q510	2211732 or	2SC1845-F or	C519-C522	354700109	1 μ F,160V,Elect.
Q542	2213284	2SC1740S-R	C527,C528	354700109	1 μ F,160V,Elect.
Q543	2202253,*	2SC4467-O,	C541	354761009	10 μ F,35V,Elect.
2202254,*	2SC4467-Y,	C542	374724714	470pF \pm 5%,50V,Plastic	
2202256,*	2SC4467-P,	C544	354742219	220 μ F,16V,Elect.	
2202502 or	* 2SC3181N-R or	C548	374726834	0.068 μ F \pm 5%,50V,Plastic	
2202503	* 2SC3181N-O	C549	374724734	0.047 μ F \pm 5%,50V,Plastic	
Q544	2202243,*	2SA1694-O,	C550,C551	354700109	1 μ F,160V,Elect.
2202244,*	2SA1694-Y,	C554	354700109	1 μ F,160V,Elect.	
2202246,*	2SA1694-P,	C907,C908	3504258	12000 μ F,63V,Elect.	
2202492 or	* 2SA1264N-R or	C913,C914	3504213	4700 μ F,35V,Elect.	
2202493	* 2SA1264N-O	C923	354753329	3300 μ F,25V,Elect.	
Q545	2211733	2SC1845-E	C924	354761029	1000 μ F,35V,Elect.
Q561	2211792 or	2SA992-F or	C927,C928	354761009	10 μ F,35V,Elect.
2211793	2SA992-E	C929	354751029	1000 μ F,25V,Elect.	
Q924	2211455	2SA1015-GR	C931	354761009	10 μ F,35V,Elect.
Q925	2213830	DTB113ZS	C932	354762219	220 μ F,35V,Elect.
Q926	2213640	DTC123JS	C933	354782219	220 μ F,50V,Elect.
Q941	221282	DTC144ES	C936	354754719	470 μ F,25V,Elect.
Q942	2213510	DTA114ES	C971	354721019	100 μ F,6.3V,Elect.
Diodes					
D501-D505	223205 or	1SS270A or	R511,R512	5210261	N06HR 5KBC,Trim
D902-D904	223163	1SS133	R517-R520	452530824	8.2 ohm,1/2W,Metal
D561	224450512	MTZ5.1B	R521,R522	4000132Y	0.22 ohm \times 2,5W+5W,Metal plate
D901	22380038	RBV602	R523-R526	451630824	8.2 ohm,1W,Metal
D911	22380048	RBA402	R527-R532	452534794	0.47 ohm,1/2W,Metal
			R533,R534	442522724	2.7 kohm,1/2W,Metal oxide

CIRCUIT NO.	PART NO.	DESCRIPTION
SPEAKER TERMINAL PC BOARD (NAETC-4694-1/1A)		
CIRCUIT NO.	PART NO.	DESCRIPTION
P502	25060114	NTM-2PDML-048,Speaker terminal
HEADPHONE TERMINAL PC BOARD (NAETC-4695-1)		
CIRCUIT NO.	PART NO.	DESCRIPTION
P504	25045255	YKB26-5009,Headphone terminal

CIRCUIT NO.	PART NO.	DESCRIPTION
DISPLAY CIRCUIT PC BOARD (NADIS-4697-1/1A/1B)		
CIRCUIT NO.	PART NO.	DESCRIPTION
U701	24130007	GP1U571X
Q703	212120	13-BT-131GK
Q701	22240684	SC78012CW-027
Q702	22240685R9	M66004FP
Transistors		
Q704,Q705	2213284	2SC1740S-R
Q706	221282	DTC144ES
Q707	2213640	DTC123JS
Q708	2213510	DTA114ES
Q709	2212794	2SD1468-R
Diodes		
D701-D704	223205 or	1SS270A or
D706,D710	223163	1SS133
D707,D708	224450562	MTZ5.6B
D711	224451303	MTZ13C
D713-D715	223205 or	1SS270A or
D716,D717	223163	1SS133
D718	225142	SEL2913K,LED
L701-L703	233411K220	NCH-1387
F911,F912	252166Y	Resonator
252079	Δ 6.3A-SE-EAK <P/W/Q>	Coils
F911A,F912A	25050065	Fuseholders
P201A	25055500	Plugs
P601A	25055498	Terminals
P602A	25055499	Wire traps
P603A	25055503	Wire trap
P301-P303	25045300	Wire trap
P304	25045303	Wire trap
P501	25060125	Wire trap
JL401	25050531	Wire trap
JL701A	25050612 or	Wire trap
25050705	NSCT-32P509	Wire trap
CENTER SPEAKER TERMINAL PC BOARD (NAETC-4693-1/1A)		
CIRCUIT NO.	PART NO.	DESCRIPTION
JL701B	25050578	NSCT-32P389
P702A	25055510	Plug
Q701B	25050912	Socket
D712A,D716A	27190843	Holders
Q703A	27190913Y	Socket

NOTE: THE COMPONENTS IDENTIFIED BY MARK ▲
ARE CRITICAL FOR RISK OF FIRE AND
ELECTRIC SHOCK. REPLACE ONLY WITH
PART NUMBER SPECIFIED.

SURROUND CIRCUIT PC BOARD (NAAF-4698-1)

CIRCUIT NO.	PART NO.	DESCRIPTION	CIRCUIT NO.	PART NO.	DESCRIPTION
	ICs			Capacitors	
Q451,Q471	22240247 or 22240293	BA15218N or NJM4558L-D	C643	354761009	10 μ F,35V,Elect.
Q499	22240239	TA7291S	C644	392841007	10 μ F,16V,Elect.
Q601,Q605	22240247 or	BA15218N or	C647-C649	354761009	10 μ F,35V,Elect.
Q673,Q674	22240293	NJM4558L-D	C653	374723924	3900pF \pm 5%,50V,Plastic
Q602	22240683 or 22240692	NJM2177L or M69032P	C655,C659	374726834	0.068 μ F \pm 5%,50V,Plastic
Q651	22240686 or 22240687	M65830P or NJU9701D	C656	354744709	47 μ F,16V,Elect.
Q671	22240266	TC9213P	C657,C658	353781099	0.1 μ F,50V,Elect.
Q691	22240339	LC7823N	C663,C665	354721019	100 μ F,6.3V,Elect.
Q692	22240270	LC7822N	C666	375524744	0.47 μ F \pm 5%,50V,Plastic
	Transitors		C671,C672	354780229	2.2 μ F,50V,Elect.
Q491-Q495	2213631 or	RN1241-A or	C675,C676	354761009	10 μ F,35V,Elect.
Q603,Q604	2213632	RN1241-B	C677,C678	354780229	2.2 μ F,50V,Elect.
Q496-Q498	2213510	DTA114ES	C679,C680	354761009	10 μ F,35V,Elect.
Q675	2213631 or 2213632	RN1241-A or RN1241-B	C681,C682	354780109	1 μ F,50V,Elect.
	Diodes		C683,C684	374721034	0.01 μ F \pm 5%,50V,Plastic
D651,D652	223205 or 223163	ISS270A or ISS133	C685,C686	354761009	10 μ F,35V,Elect.
	Coil		R450	5144017Y	N16RQL50KA25F,Variable,Volume
				Sockets	
L651	233411K220	NCH-1387	P601	25050445	NSCT-8P269
	Resonator		P602	25050446	NSCT-10P270
X651	3010217	CST2.04MG040,Ceramic	P603	25050450	NSCT-18P274
	Capacitors		P611	2000802	NSAS-6P758
			P621	25055411	NPGLG-9P393
C451,C452	354780229	2.2 μ F,50V,Elect.		RI/MR TERMINAL PC BOARD (NAETC-4699-1/1B)	
C459-C462	354761009	10 μ F,35V,Elect.		CIRCUIT NO.	PART NO.
C471,C472	354780229	2.2 μ F,50V,Elect.			DESCRIPTION
C479-C482	354761009	10 μ F,35V,Elect.	Q961,Q962	221282	Transistors
C491-C493	354761009	10 μ F,35V,Elect.			DTC144ES
C494	354721019	100 μ F,6.3V,Elect.	D961-D963	223205 or 223163	Diodes
C601,C602	354761009	10 μ F,35V,Elect.			1SS270A or 1SS133
C605,C606	354761009	10 μ F,35V,Elect.			Capacitors
C607-C610	353781099	0.1 μ F,50V,Elect.	C961	354761009	10 μ F,35V,Elect.
C613,C614	374724734	0.047 μ F \pm 5%,50V,Plastic	C962	374724724	4700pF \pm 5%,50V,Plastic
C615,C616	374722234	0.022 μ F \pm 5%,50V,Plastic			Jacks
C617-C620	353781099	0.1 μ F,50V,Elect.	P961	25045293	HSJ-1003-01-012
C621,C622	354780479	4.7 μ F,50V,Elect.	P962	25045172	HSJ-1003-01-020
C623-C627	353782299	0.22 μ F,50V,Elect.			Switch
C628	354761009	10 μ F,35V,Elect.	S961	25065286	NSS-22112,AM band <W>
C629	354786899	0.68 μ F,50V,Elect.			Wire trap
C630	374724734	0.047 μ F \pm 5%,50V,Plastic	JL961	25050527	NSCT-5P350
C631,C660	374725624	5600pF \pm 5%,50V,Plastic			STC SWITCH PC BOARD (NASW-4700-1)
C632,C651	354780229	2.2 μ F,50V,Elect.			CIRCUIT NO.
C634	354722219	220 μ F,6.3V,Elect.			PART NO.
C635	354741019	100 μ F,16V,Elect.	S729	25035548	DESCRIPTION
C636-C641	354761009	10 μ F,35V,Elect.	P702B	25050454	NPS-111-S510,Switch
C642,C661	374724724	4700pF \pm 5%,50V,Plastic			NSCT-3P278,Socket

NOTE: THE COMPONENTS IDENTIFIED BY MARK Δ
ARE CRITICAL FOR RISK OF FIRE AND
ELECTRIC SHOCK. REPLACE ONLY WITH
PART NUMBER SPECIFIED.

TUNER CIRCUIT PC BOARD (NARF-4701-1/1A/1B)

CIRCUIT NO.	PART NO.	DESCRIPTION	CIRCUIT NO.	PART NO.	DESCRIPTION	
	Front end			Capacitors		
TU001	240088	FE337-A07 <D>	C160	374721034	0.01 μ F \pm 5%, 50V, Plastic	
	240089	FE415-G11 <P/W/Q>	C201	354744719	470 μ F, 16V, Elect.	
	ICs		C202	354742209	22 μ F, 16V, Elect.	
Q104	22240039	LA1266	C205	354782299	0.22 μ F, 50V, Elect.	
Q107	22240090	LM7001	C206	354780109	1 μ F, 50V, Elect.	
Q201	22240242	AN7470	C207	354780339	3.3 μ F, 50V, Elect.	
Q208	22240247 or 22240293	BA15218N or NJM4558L-D	C208	370134714	470pF \pm 5%, 100V, Plastic	
	Transistors		C209,C224	374724734	0.047 μ F \pm 5%, 50V, Plastic	
Q101	2210746	2SC945A-P <P/W/Q>	C211,C212	374721824	1800pF \pm 5%, 50V, Plastic <D>	
Q102	2211723	2SC1923-O		374721224	1200pF \pm 5%, 50V, Plastic <P/Q>	
Q105	2212445	2SK365-GR	C213,C214	354742209	374721524	1500pF \pm 5%, 50V, Plastic <W>
Q106	2213284	2SC1740S-R	C215,C216	354761009	22 μ F, 16V, Elect.	
Q108,Q109	2213510	DTA114ES	C219,C220	374726824	10 μ F, 35V, Elect.	
Q205,Q206	2212794	2SD1468-R		374724724	6800pF \pm 5%, 50V, Plastic <D>	
Q207	2213510	DTA114ES		374725624	4700pF \pm 5%, 50V, Plastic <P/Q>	
	Diodes		C222	354780229	374721024	5600pF \pm 5%, 50V, Plastic <W>
D103	224450512	MTZ5.1B	C223	338324715	2.2 μ F, 50V, Elect.	
D201,D202	223205 or	1SS270A or		470pF \pm 10%, 50V, Ceramic <P/W/Q>		
D206,D207	223163	1SS133	C225,C226	354761009	10 μ F, 35V, Elect.	
	Coils and transformers			Trim resistors		
L101	233401	NFIF-4072	R101	5210266	N06HR100KBC	
L102	233402	NFIF-4073	R201	5210261	N06HR5KBC	
L103	233411M022	NCH-1375	R202	5210267	N06HR200KBC	
L104	233383	NMC-6070 <P/W/Q>		Terminal		
L151	232148	NMRF-7050	P101	25060160	NTM-4PDMN086 <D>	
L152	232139	NMIF-4062		25060117	NTM-2PDMN051 <P/W/Q>	
L201,L202	233355A	NMC-4059		Socket		
	Ceramic filters		P201	25050447	NSCT-12P271	
X101	3010071	SFE10.7MA5		POWER SUPPLY CIRCUIT PC BOARD (NAPS-4702-1/1A/1B/1C/1D)		
X102	3010071	SFE10.7MA5 <P/W/Q>	CIRCUIT NO.	PART NO.	DESCRIPTION	
X103	3010071	SFE10.7MA5 <D>		Transistors		
	3010130	SFE10.7MZ2A <P/W/Q>	Q951	221282	DTC144ES	
X151	3010123	SFZ-450JL	Q952	2213650	DTD113ZS	
X152	3010076	BFU-450C		Diodes		
	Resonator		D951-D954	22380046 or	AM01Z or	
X104	3010158 or	XTL-7.2M,		22380035	GP104003E	
	3010141	Crystal	D955-D957	223205 or	1SS270A or	
	Capacitors			223163	1SS133	
C001	354741019	100 μ F, 16V, Elect.		Power transformer		
C108,C124	354741019	100 μ F, 16V, Elect.	T902	2300670Y	Δ NPT-1111D <D>	
C112,C118	354780229	2.2 μ F, 50V, Elect.		2300671Y	Δ NPT-1111P <P>	
C113	354784799	0.47 μ F, 50V, Elect.		2300672Y	Δ NPT-1111DG <W>	
C117	374723334	0.033 μ F \pm 5%, 50V, Plastic		2300673Y	Δ NPT-1111Q <Q>	
C119,C161	353782299	0.22 μ F, 50V, Elect.		Relay		
C123,C152	354721019	100 μ F, 6.3V, Elect.	RL901	25065248	Δ NRL-1P15A-DC12-29	
C154	354780479	4.7 μ F, 50V, Elect.		Capacitors		
C155-C157	354761009	10 μ F, 35V, Elect.	C901	3500065A	Δ DE7150FZ103PAC400/125V, IS	
C159	374724734	0.047 μ F \pm 5%, 50V, Plastic	C952	354742219	220 μ F, 16V, Elect.	

CAUTION: Replacement for transistor of mark *, if necessary, must be made from the same beta group (H_{FE}) as the original type.

NOTE: THE COMPONENTS IDENTIFIED BY MARK Δ ARE CRITICAL FOR RISK OF FIRE AND ELECTRIC SHOCK. REPLACE ONLY WITH PART NUMBER SPECIFIED.

CIRCUIT NO.	PART NO.	DESCRIPTION
Resistors		
R901	431523355	Δ 3.3 Mohm, 1/2W, Solid <D>
R951	452530824	Δ 8.2 ohm, 1/2W, Metal
Fuse		
F901	252166Y	Δ 6.3A-UL/T-237 <D/W>
F902	252076	Δ 3.15A-SE-EAK <P/W/Q>
F903	252075	Δ 2.5A-SE-EAK <P>
Fuseholders		
F901A	25050065	Δ YSH403T <D/W>
F902A	25050065	Δ YSH403T <P/W/Q>
F903A	25050065	Δ YSH403T <P>
AC outlet		
P902	25050409	Δ NSCT-4P234 <D>
	25050640	Δ NSCT-4P451 <P/W>
Switch		
S901	25065437	Δ NSS-22157P <W>
REAR AMPLIFIER PC BOARD (NAAF-4703-1/1A)		
CIRCUIT NO.	PART NO.	DESCRIPTION
ICs		
Q571,Q572	22240108	μ PC1225H
Transistors		
Q562,Q563	2211732 or	2SC1845-F or
Q579,Q580	2211733	2SC1845-E
Q573,Q574	2213284	2SC1740S-R
Q575,Q576	2202063, 2202064 or 2202066	* 2SC4511-O, * 2SC4511-Y or * 2SC4511-P
Q577,Q578	2202053, 2202054 or 2202056	* 2SA1725-O, * 2SA1725-Y or * 2SA1725-P
Coils		
L571,L572	231209S	S-0.4A
Capacitors		
C563	354721019	100 μ F, 6.3V, Elect.
C571,C572	354761009	10 μ F, 35V, Elect.
C577,C578	354721019	100 μ F, 6.3V, Elect.
C585,C586	374723334	0.033 μ F \pm 5%, 50V, Plastic
C587,C588	374724734	0.047 μ F \pm 5%, 50V, Plastic
C595,C596	354761009	10 μ F, 35V, Elect.
Resistors		
R585,R586	4000131Y	0.22 ohm \times 2, 2W+2W, Metal plate
R587-R590	452530824	8.2 ohm, 1/2W, Metal
R597	452530824	8.2 ohm, 1/2W, Metal
Plug		
P611A	25055234	NPLG-3P218
Wire traps		
JL571	25050280	NSCT-3P108
JL572	25050282	NSCT-5P110

TONE CONTROL CIRCUIT PC BOARD (NAAF-4704-1)

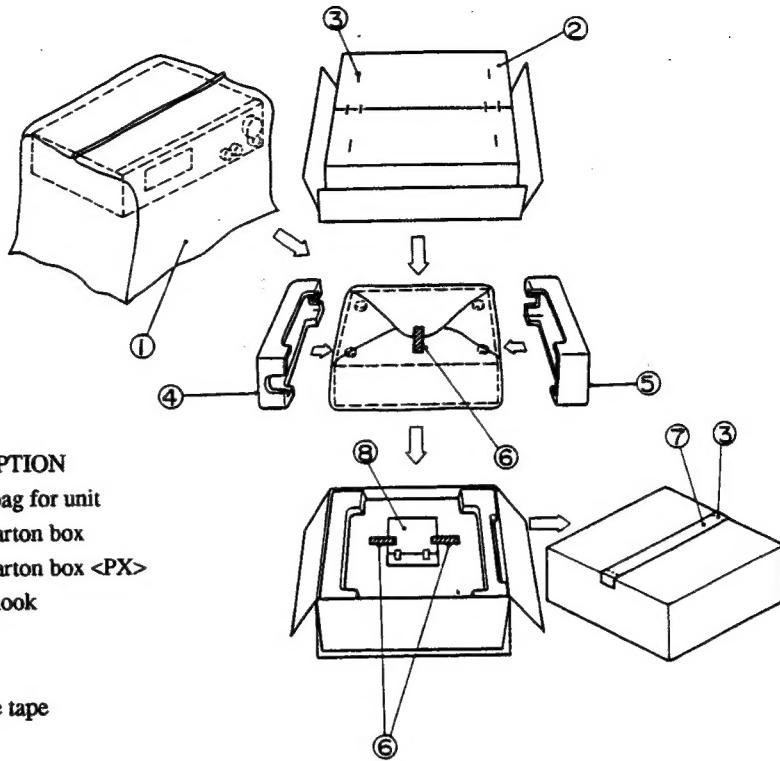
CIRCUIT NO.	PART NO.	DESCRIPTION
ICs		
Q401,Q402	22240247 or 22240293	BA15218N or NJM4558L-D
Transistors		
Q403-Q406	2211945	2SK246-GR
Diodes		
D401-D404	223205 or 223163	1SS270A or 1SS133
Capacitors		
C401,C402	354761009	10 μ F, 35V, Elect.
C405,C406	354744709	47 μ F, 16V, Elect.
C407,C408	374721534	0.015 μ F \pm 5%, 50V, Plastic
C411,C412	374721534	0.015 μ F \pm 5%, 50V, Plastic
C413-C416	374721044	0.1 μ F \pm 5%, 50V, Plastic
C417-C420	374721024	1000pF \pm 5%, 50V, Plastic
Variable resistors		
R393	5104225	N11RGLC250KWT22Z, Balance
R407	5104230	N14RLC100KWT22Z, Bass
R413	5104230	N14RLC100KWT22Z, Treble

VIDEO CIRCUIT PC BOARD (NAETC-4705-1)

CIRCUIT NO.	PART NO.	DESCRIPTION
IC		
Q251	22240373	BA7625
Transistors		
Q252-Q254	2213354	2SA933S-R
Diodes		
D251	22380046 or 22380035	AM01Z or GP104003E
Capacitors		
C251,C253	354780229	2.2 μ F, 50V, Elect.
C252,C254	354724719	470 μ F, 6.3V, Elect.
C255	354780229	2.2 μ F, 50V, Elect.
C258	354724719	470 μ F, 6.3V, Elect.
C259	354721019	100 μ F, 6.3V, Elect.
Terminals		
P251	25045339	NPJ-4PDYE-190
P252	25045395	NPJ-2PDYE-221
Wire trap		
JL251	25050529	NSCT-7P352

NOTE: <D>: 120V model Only
<P>: 230V/240V models Only
<W>: Worldwide model Only
<Q>: 240V model Only

PACKING VIEW



REF.NO.	PART NO.	DESCRIPTION
1	29100034A	Styrene bag for unit
2	29052568Y	Master carton box
	29052574Y	Master carton box <PX>
3	282301	Sealing hook
4	29091615Y	Pad R
5	29091614Y	Pad L
6	261504	Adhesive tape
7	29110071	PP tape
8	Accessory bag ass'y	
	29341810Y	Instruction manual <D/PX>
	29341812Y	Instruction manual <P/W/C>
	29341845Y	Instruction manual <W>
	292111	FM antenna <D>
	292112	FM antenna <P/W>
	232140	NMA-3057,AM loop antenna
	2010200	Connection cord
	3010054	UM-3,Two batteries
	24140252Y	RC-252S,Remote control transmitter
	25065462	YAE21-0237,FM adaptor <W/F>
	25055018	CV-K-1,Conversion plug <W>
	25055251	CV-CP,Conversion plug <PX>
	29365019A	Warranty card <N>
	29365024A	Warranty card <F>
	29365021	Warranty card <PX>
	29358002J	Service station list <N>
	29100097	Styrene bag for accessory
	29100107	Styrene bag for warranty card <F>

NOTE: <D>:120V model only
 <P>:230V/240V models only
 <W>:Worldwide model only
 <F>:French model only
 <PX>:PX model only
 <C>:Canadian model only

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